

Part B 1G-1

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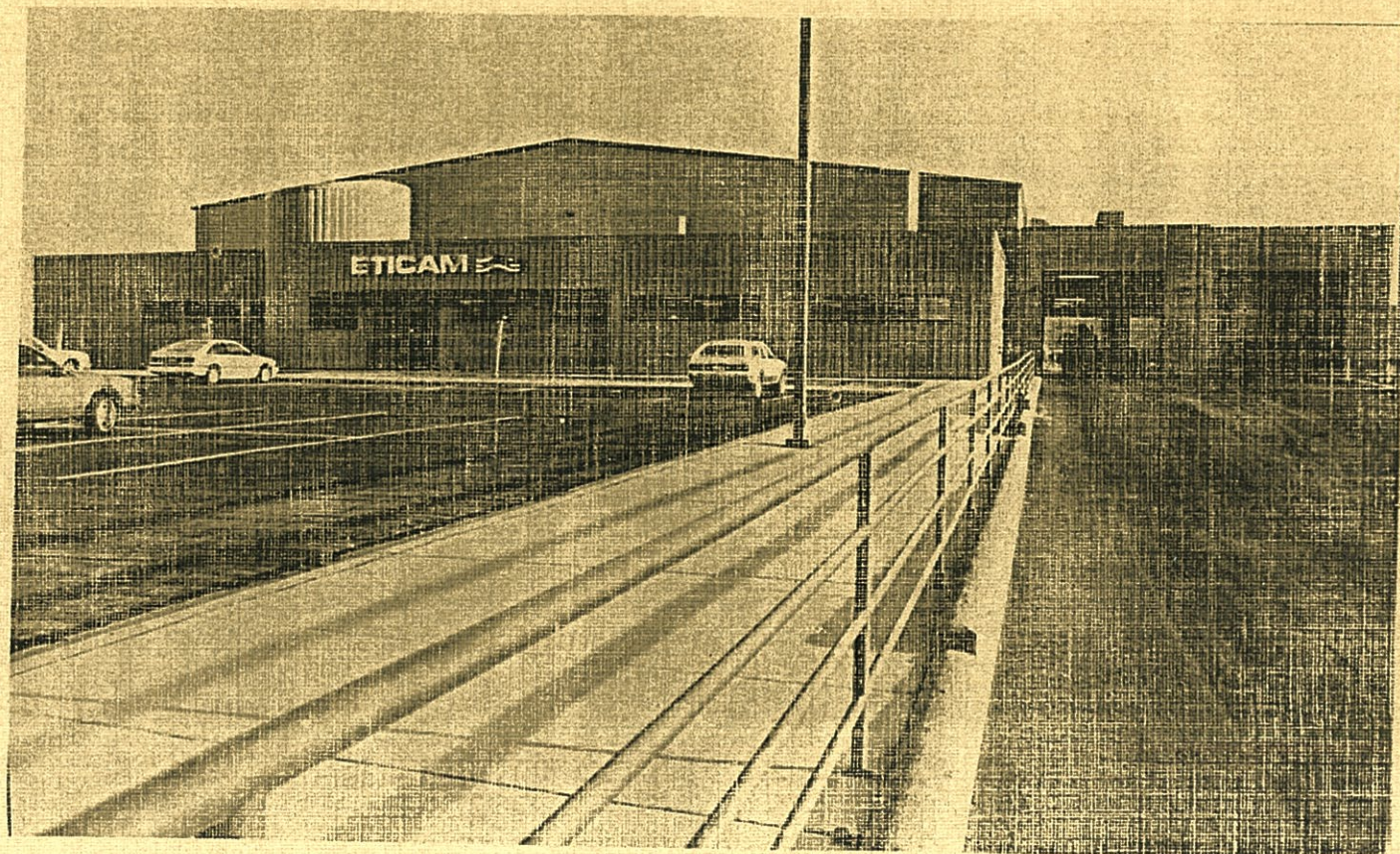


ETICAM - FERNLEY NEVADA

Application For

PART B PERMIT MODIFICATION

October 25, 1989





October 25, 1989

Verne Rosse, P.E.
Nevada Department of Environmental Protection
201 South Fall Street
Capitol Complex
Carson City, Nevada 98710

RECEIVED

OCT 25 1989

ENVIRONMENTAL
PROTECTION

Re: Part B Permit Modifications

Dear Mr. Rosse,

Attached is the revised Part B application incorporating the following changes:

1. The effluent storage, evaporator/crystallizer, and drum storage pad have been added. These facilities are currently operating under a Part A interim status.
2. Changes have been made to the existing permit language to conform to actual operating conditions, and new regulatory requirements.
3. Expansion to the number and volume of tanks, for storing liquids and sludges.
4. Expansion to the evaporator/crystallizer capacity with the addition of a multiple effect flash evaporator and evaporator/crystallizer.
5. New waste codes have been added.
6. New facilities for receiving, and storing containers.
7. Expanded facilities for receiving and processing sludges.

Under a separate cover, ETICAM is also applying for a 25 % tank volume expansion under Class 2 permit modification procedures. Parts of this application, ie. waste analysis revisions and operating descriptions, will also apply to that application.

Sincerely,

Byron B. Bradd

Byron B. Bradd, P.E.
General Manager

Rhode Island
Corporate/Sales:
410 South Main Street
Providence, RI 02903
Telephone: (401) 831-7242
1-800-541-8673
FAX: (401) 831-7383

Rhode Island
Plant:
25 Graystone Street
Warwick, RI 02886
Telephone: (401) 738-3261
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EPA# RID 00005000

Nevada
2095 Newlands Dr. E.
Fernley, NV 89408
Telephone: (702) 575-2760
1-800-648-9931
FAX: (702) 575-2803
EPA# NVD 00005338

Texas
9 Lucius McCelvey Drive
Temple, TX 76500
EPA# TXD 981903768

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Granite City, IL 62040
EPA# ILL 001521612

ETICAM - FERNLEY NEVADA
Application For
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CERTIFICATION

ETICAM
Fernley, Nevada
Part B Permit Modification

October, 1989

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Benjamin A. Simon
NAME

President
TITLE

10/21/89
DATE

ETICAM
Fernley, Nevada

Revised: October 1989

(~~-----~~) = deletion

BOLD = addition

EPA ID #: NVD 980-895-338

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

PERMIT

FOR HAZARDOUS WASTE STORAGE AND TREATMENT

Permittee: ETICAM

Permit Number: NEVHW001

Facility: ETICAM

This permit is issued by the Nevada Division of Environmental Protection (NDEP) under authority of Nevada Revised Statutes (NRS) 459.520 and Nevada Administrative Code (NAC) 444.8500 through 444.9335, inclusive, to ETICAM (hereafter called the Permittee), to operate a hazardous waste management facility located in Fernley, Nevada, on 2095 Newlands Drive East, at latitude 32 degrees 36 feet 37 inches North and longitude 119 degrees 12 feet 7 inches West.

The permittee must comply with all terms and conditions of this permit. This permit consists of the conditions contained herein (Parts I through V consisting of pages 1 through 32 and Attachments 1 through 10) and the applicable regulations contained in 40 CFR Parts 260 through 264 and 124 and 270, and NAC 444.8500 through 444.9335 as specified in the permit. Applicable regulations are those which are in effect on the date of issuance of this permit.

This permit is based upon the assumption that the information submitted in the permit application attached to the Permittee's letter dated February 28, 1985 as modified by subsequent amendments dated May 15, 1985, September 10, 1985 April 15, 1986 and July 16, 1986 (hereafter referred to as the application) is accurate and that the facility will be constructed and/or operated as specified in the application. Any inaccuracies found in this information may be grounds for the termination or modification of this permit and potential enforcement

action. The Permittee must inform NDEP of any deviation from or changes in the information in the application which would affect the Permittee's ability to comply with the applicable regulations or permit conditions.

This permit is effective as of December 24, 1986, and shall remain in effect until December 24, 1991, unless revoked or reissued, or terminated in accordance with NAC 444.8730 or continued in accordance with NAC 444.8730.

PART I - STANDARD CONDITIONS

1. EFFECT OF PERMIT

This permit authorizes only the management of hazardous waste expressly described in this permit and does not authorize any other management of hazardous waste. NDEP will consider compliance with the terms of this permit to be compliance with the requirements of NRS 459.400 through 459.600 and NAC 444.8500 through 444.9335 concerning the management of hazardous waste described in this permit. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local laws or regulations. Compliance with the terms of this permit does not constitute a defense to any action brought under NRS 459.565, 459.570, 459.575, 459.580, 459.585, 459.595, and 459.600, or any other law governing protection of public health or the environment.

2. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated for cause as specified in NAC 444.8730 and 40 CFR subsection 270.41, subsection 270.42 and subsection 270.42. The filing of a request for a permit modification, revocation and reissuance, or termination or the notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition.

C. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

D. DEFINITIONS

For the purpose of this permit, terms used herein shall have the same meaning as those in NAC 444.8500 through 444.9335 and Title 40 of the Code of Federal Regulations (40 CFR Parts 260 through 264 and 270), unless this permit specifically states otherwise; where terms are not otherwise defined the meaning associated with such terms shall be as defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term. "Administrator" is the Administrator of the Nevada Division of Environmental Protection.

E. REPORTS, NOTIFICATIONS AND SUBMISSIONS TO THE ADMINISTRATOR

All reports, notifications or other submissions which are required by this permit to be sent or given to the Administrator should be sent certified mail or given to:

Program Director, Waste Management Section
Nevada Division of Environmental Protection
Capitol Complex
Carson City, Nevada 89710
Telephone Number: (702) 885-4670

F. SIGNATORY REQUIREMENTS

All reports or other information requested by the Administrator shall be signed and certified as required by NAC 444.8730 and 40 CFR subsection 270.11.

G. DOCUMENTS TO BE MAINTAINED AT THE FACILITY SITE

The Permittee shall maintain at the facility, until closure is completed and certified by an independent Nevada registered professional engineer, the following documents and amendments, revisions and modifications to these documents:

1. Waste analysis plan required by NAC 444.8870, 40 CFR subsection 264.13 and this permit.
2. Personnel training documents and records required by NAC 444.8890, 40 CFR subsection 264.16(d) and this permit.
3. Contingency plan required by NAC 444.9030, 40 CFR subsection 264.112(a) and this permit.
4. Closure plan required by NAC 444.9030, 40 CFR subsection 264.112(a) and this permit.
5. Annually-adjusted cost estimate for facility closure required by NAC 444.9050, 40 CFR subsection 264.142 (d) and this permit.
6. Operating record required by NAC 444.8970, 40 CFR subsection 264.73 and Part II, Section G.1 of this permit.

7. Inspection schedules and logs required by NAC 444.8885, 40 CFR subsection 264.15(b) and this permit.
8. Documents required by Part I, Sections E and F, and Part II, Sections A through P of this permit.

H. DUTIES AND REQUIREMENTS

1. Duty to Comply. The Permittee shall comply with all conditions of this permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit. Any other permit noncompliance constitutes a violation of RCRA and NRS 459.515 and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or denial of a permit renewal application.
2. Duty to Reapply. If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must submit a complete application for a new permit at least 180 days before this permit expires.
3. Permit Expiration. This permit and all conditions therein will remain in effect beyond the permit's expiration date if the Permittee has submitted a timely, complete application (see NAC 444.8730, 40 CFR subsection 270.14 - 270.29 and subsection 270.10) and through no fault of the Permittee, the Administrator has not issued a new permit as set forth in NAC 444.8730 and 40 CFR subsection 124.15.

4. Need to Halt or Reduce Activity Not a Defense. It shall not be a defense for the permittee in an enforcement action to argue that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
5. Duty to Mitigate. In the event of noncompliance with this permit, the permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment.
6. Proper Operation and Maintenance. The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facility or similar systems to maintain compliance with the conditions of the permit.
7. Duty to Provide Information. The Permittee shall furnish to the Administrator, within a reasonable time, any relevant information which the Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also fur-

nish to the Administrator, upon request, copies of records required to be kept by this permit.

8. Inspection of Entry. The Permittee shall allow the Administrator, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

- a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- d. Sample or monitor, at reasonable times for the purposes of assuring permit compliance or as otherwise authorized by NRS 459.400 through 459.600, any substances or parameters at any location.

9. Monitoring and Records.

- a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the waste to be analyzed must be

the appropriate method from Appendix I of 40 CFR Part 261 or an equivalent method approved by the Administrator. Laboratory methods must be those specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846, (July 1982; 2nd) Nov. 1986, 3rd ed.), Standard Methods of Waste Water Analysis (15th ed.; 1980) or an equivalent method approved by the Administrator and as specified in the attached waste analysis plan.

b. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this permit, and records of all data used to complete the allocation for this permit for a period of at least 3 years from the date of the sample, measurement, report or record. These periods may be extended by request of the Administrator at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility.

c. Records of monitoring information shall specify:

- (1) The dates, exact place, and times of sampling or measurements;
- (2) The individuals who performed the sampling or measurements;
- (3) The dates analyses were performed;

- (4) The individuals who performed the analysis;
- (5) The analytical techniques or methods used; and
- (6) The results of such analyses.

10. Reporting Planned Changes. The Permittee shall give notice to the Administrator as soon as possible of any planned physical alterations or additions to the permitted facility. This notice must include a description of all incidents of noncompliance reasonably expected to result from the proposed changes.
11. Anticipated Noncompliance. The Permittee shall give advance notice to the Administrator of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
12. Transfer of Permits. This permit may be transferred to a new owner or operator only if it is modified or revoked and reissued pursuant to NAC 444.8730, 40 CFR subsection 270.47(b)(2) or subsection 270.42(d). Before transferring ownership or operation of the facility during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of 40 CFR Parts 264 and 270, and NAC 444.8500 through 444.9335.
13. Twenty-Four Hour Reporting. The Permittee shall report to the Administrator any noncompliance which may endanger health or the environment. Information shall be provided orally within twenty-four

(24) hours from the time the permittee becomes aware of the circumstances. This report shall include the following:

- a. Information concerning the release of any hazardous waste that may endanger public drinking water supply sources.
- b. Any information of a release or discharge of hazardous waste, or of a fire or explosion at the facility, which could threaten the environment or human health. The description of the occurrence and its cause shall include:
 - (1) Name, address, and telephone number of the owner or operator;
 - (2) Name, address, and telephone number of the facility;
 - (3) Date, time, and type of incident;
 - (4) Name and quantity of material(s) involved;
 - (5) The extent of injuries, if any;
 - (6) An assessment of actual or potential hazard to the environment and human health outside the facility, where this is applicable; and
 - (7) Estimated quantity and disposition of recovered material that resulted from the incident.

A written submission shall also be provided to the Administrator within five (5) days of the time the Permittee becomes aware of the cir-

cumstances. The written submission shall contain a description of the noncompliance and its cause; the periods of noncompliance (including exact dates and times); if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrences of the non-compliance. The Permittee need not comply with the five (5) day written notice requirement if the Administrator waives that requirement and the Permittee submits a written report within fifteen (15) days of the time the Permittee becomes aware of the circumstances.

14. Other Noncompliance. The Permittee shall report all other instances of non-compliance not otherwise required to be reported above, at the time monitoring reports are submitted. The reports shall contain the information listed in permit condition Part I.H.13.
15. Other Information. Whenever the Permittee becomes aware that he or she failed to submit any relevant facts in the permit application, or submitted incorrect information in a permit application or in any report to the Administrator, the Permittee shall promptly submit such facts or information to the Administrator.
16. Documents to be Submitted Prior to Operation. The Permittee shall submit completed financial assurance documents, completed liability insurance documents and the list of emergency coordinators in Section 7.31 of the application to the Administrator at least sixty (60) days before commencement of operation of the facility.

17. Certification of Construction or Modification. The Permittee may not manage a hazardous waste at the facility until:
- a. The Permittee has submitted to the Administrator by certified mail or hand delivery a letter signed by the Permittee and a Nevada registered professional engineer, stating that the facility has been constructed or modified in compliance with the permit; and
 - b. The Administrator has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of the permit; or
 - c. The Administrator has either waived the inspection or has not within fifteen (15) days notified the Permittee of his intent to inspect.
18. Release of Hazardous Waste. NDEP reserves the right to require the Permittee to conduct any investigation or mediation necessary to protect human health and the environment from past or present releases from solid waste management units. The Permittee shall notify NDEP, in writing, within 24 hours of discovery of a release of hazardous waste or hazardous constituents from a solid waste management unit, as defined pursuant to Section 3004(u) of the Resource Conservation and Recovery Act, or the existence of a previous solid waste management area.

PART II - GENERAL FACILITY CONDITIONS

A. DESIGN AND OPERATION OF FACILITY

The Permittee shall maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment.

B. GENERAL WASTE ANALYSIS

The Permittee shall follow the procedures described in the attached waste analysis plan, Attachment 1. The Permittee shall verify its waste analysis as part of its quality assurance program, in accordance with current EPA practices (Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW 846, (July 1982; 2nd) Nov. 1986 3rd ed.) or equivalent methods approved by the Administrator in accordance with procedures in 40 CFR subsection 260.20 and 260.21; and at a minimum maintain proper functional instruments, use approved sampling and analytical methods, verify the validity of sampling and analytical procedures, and perform correct calculations.

C. GENERAL INSPECTION REQUIREMENTS

The Permittee shall follow the inspection plan set out in the inspection schedule, Attachment 2. The Permittee shall remedy any deterioration or malfunction discovered by an inspection as required by NAC 444.8885 and 40 CFR subsection 264.15(c). Records of inspections shall be kept as required by NAC 444.8885 and 40 CFR subsection 264.15(d).

D. PERSONNEL TRAINING

The Permittee shall conduct personnel training as required by NAC 444.8890 and 40 CFR subsection 264.16. This training program shall follow the attached outline, Attachment 3. The Permittee shall maintain training documents and records as required by NAC 444.8890 and 40 CFR subsection 264.16(d) and (e).

PREPAREDNESS AND PREVENTION

1. Required Equipment. At a minimum, the Permittee shall equip the facility with the equipment set forth in the contingency plan, Attachment 4, as required by NAC 444.8905 and 40 CFR subsection 264.32.
2. Testing & Maintenance of Equipment. The Permittee shall test and maintain the equipment specified in the previous permit condition and in Attachment 4 as necessary to assure its proper operation in time of emergency.
3. Access to Communications or Alarm System. The Permittee shall maintain access to the communications or alarm system as required by NAC 444.8910 and 40 CFR subsection 264.34.
4. Required Aisle Space. At a minimum, the Permittee shall maintain aisle space as required by NAC 444.8915 and 40 CFR subsection 264.35 and as shown on the plans and specifications, Attachment 5.
5. Arrangements with Local Authorities. The Permittee shall maintain arrangements with State and Local authorities as required by NAC

444.8920 and 40 CFR subsection 264.37. If State or local officials refuse to enter into or renew existing preparedness and prevention arrangements with the Permittee, the Permittee must document this refusal in the operating record.

6. Water for Fire Control. The Permittee shall provide water at adequate volume and pressure to supply water hose streams or automatic sprinkler systems as required by NAC 444.8905 and 40 CFR subsection 264.32.

F. CONTINGENCY PLAN

1. Implement of Plan. The Permittee shall immediately carry out the provision of the contingency plan, Attachment 4, and follow the emergency procedures described by NAC 444.8935, 444.8940, 444.8945, 444.8950 and 40 CFR subsection 264.56 whenever there is an imminent or actual fire, explosion, or release of hazardous waste or constituents which threatens or could threaten human health or the environment.
2. Copies of Plan. The Permittee shall comply with the requirements of NAC 444.8925 and 40 CFR subsection 264.53.
3. Amendments to Plan. The Permittee shall review and immediately amend, if necessary, the contingency plan, as required by NAC 444.8952 and 40 CFR subsection 264.54.
4. Emergency Coordinator. The Permittee shall comply with the requirements of NAC 444.8930 and 40 CFR subsection 264.56.

5. Emergency Procedures. The Permittee shall comply with the requirements of NAC 444.8935, 444.8940, 444.8945, 444.8950 and CFR subsection 264.56.

C. RECORD KEEPING AND REPORTING

1. Operating Record. The Permittee shall maintain a written operating record at the facility in accordance with NAC 444.8970 and 40 CFR subsection 264.73(a) and (b) (1) to (8), inclusive.
2. Annual Report. The Permittee shall comply with all applicable report requirements of NAC 444.8980.
3. Required Reports. The Permittee shall comply with all applicable reporting requirements as described in Part I, Section E and F, and Part II, Section G of this permit.

D. CLOSURE

1. Performance Standard. The Permittee shall close the facility as required by NAC 444.9005 and 40 CFR subsection 264.111 and in accordance with the closure plan, Attachment 6.
2. Amendment to Closure Plan. The Permittee shall amend the closure plan in accordance with NAC 444.9045 and 40 CFR subsection 264.112(b) whenever necessary.
3. Notification of Closure. The Permittee shall notify the Administrator at least 180 days prior to the date he expects to begin closure, and

shall comply with NAC 444.9043 for any anticipated partial closure activities.

4. Time Allowed for Closure. After receiving the final volume of hazardous waste, the Permittee shall treat or remove from site all hazardous waste and shall complete closure activities in accordance with the schedules specified in the closure plan, Attachment 6.
5. Disposal or Decontamination of Equipment. The Permittee shall decontaminate and/or dispose of all facility equipment as required by NAC 444.9010 and 40 CFR subsection 264.114 and the closure plan, Attachment 6.
6. Certification of Closure. The Permittee shall certify that the facility has been closed in accordance with the specifications in the closure plan as required by NAC 444.9010 and 40 CFR subsection 264.115.

COST ESTIMATE FOR FACILITY CLOSURE

1. Annual Adjustment. The Permittee must adjust the closure cost estimate for inflation within 30 days after each anniversary of the date on which the first closure cost estimate was prepared as required by NAC 444.9050 and 40 CFR subsection 264.142(b).
2. Adjustment for Changed Conditions. The Permittee must revise the closure cost estimate whenever there is a change in the facility's closure plan as required by NAC 444.9050 and 40 CFR subsection 264.142(c).

3. Availability. The Permittee must keep at the facility the latest closure cost estimate as required by NAC 444.9065 and 40 CFR subsection 264.142(d).

J. INCAPACITY OF OWNER/OPERATORS, GUARANTORS, OR FINANCIAL INSTITUTIONS

The Permittee shall comply with NAC 444.9065 and 40 CFR subsection 264.148 whenever necessary.

K. REQUIRED NOTICES

1. Notice to Administrator. The Permittee shall notify the Administrator in writing at least four (4) weeks in advance of the date the Permittee expects to receive hazardous waste from a foreign source.

2. Notice to Generator. When the Permittee plans to receive hazardous waste from an off-site source (except where the Permittee is also the generator), he must inform the generator in writing that he has the appropriate permits for, and will accept, the waste the generator is shipping. The Permittee must keep a copy of this written notice as part of the operating record. (See permit conditions Part II.G.1).

L. GENERAL REQUIREMENTS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE

The Permittee shall comply with the requirements of NAC 444.8895 and 40 CFR subsection 264.17.

h. MANIFEST SYSTEM

The Permittee shall comply with the manifest requirements of NAC 444.8960, 444.8965, 444.8985 and 40 CFR subsection 264.71, 264.72, and 264.76.

i. FINANCIAL ASSURANCE FOR FACILITY CLOSURE

The Permittee shall demonstrate compliance with NAC 444.9055 and 40 CFR subsection 264.143 by providing documentation of financial assurance, as required by NAC 444.9070 and 40 CFR subsection 264.151, in at least the amount of the cost estimates required by permit condition by submitting the required documentation to the Administrator at least 60 days before start-up. The Permittee's financial assurance shall be effective prior to operation of the facility. Changes in financial assurance mechanisms must be approved by the Administrator.

j. LIABILITY REQUIREMENTS

The Permittee shall comply with the requirements of NAC 444.9060 and 40 CFR subsection 264.147 and the documentation requirements of NAC 444.9060 and 40 CFR subsection 264.151, including the requirements to have and maintain liability coverage for sudden accidental occurrences in the amount of at least \$1 million per occurrence with an annual aggregate of at least \$2 million, exclusive of legal defense costs. The Permittee shall submit the required documentation to the Administrator at least 60 days before start-up.

The Permittee's liability coverage shall be effective before the Permittee's operation of the facility.

P. SECURITY

The Permittee shall comply with the security provision of NAC 444.8875 and 40 CFR subsection 264.14(b) and (c).

Q. STORAGE OF FACILITY-GENERATED SLUDGES

The Permittee shall (not) store facility-generated sludges, i.e., those sludges generated from treatment of wastes at the facility, **including salts** (for longer than ninety (90) days or in any manner other than) in containers or tanks (pursuant to) **in accordance with** Subparts I and J of 40 CFR Part 264. (and in accordance with 40 CFR Section 262.34)

PART III IN CONTAINERS

WASTE IDENTIFICATION

The Permittee may receive and store the following wastes in containers at the facility, subject to the terms of this permit.

<u>EPA Hazardous Waste Code</u>	<u>Description</u>
F006	Electroplating wastewater treatment sludge
F007	Spent Cyanide plating bath solutions
F008	Cyanide plating bath residues
F009	Spent Cyanide stripping/cleaning bath solutions
F011	Spent cyanide solutions from salt bath pot cleaning
F012	Cyanide quenching wastewater treatment sludges
F019	Wastewater treatment sludges from chemical conversion coating of aluminum
D002	Corrosive characteristics wastes
D006	Cadmium - EP Toxic
D004	Arsenic/EP Toxic
D005	Barium/EP Toxic
D009	Mercury/EP Toxic
D010	Selenium/EP Toxic
K061	Emission control dust and sludges/ steel elec. furn.
K062	Emission control dust and sludges/ steel elec. furn. spent pickle

<u>EPA Hazardous Waste Code</u>	<u>Description</u>
D007	Chromium - EP Toxic
D008	Lead - EP Toxic
D011	Silver - EP Toxic

B. CONDITION OF CONTAINERS

If a container holding hazardous waste is not in good conditions (e.g., severe rusting, apparent structural defects) or if it begins to leak, the Permittee shall transfer the hazardous waste from such container to a container that is in good condition or otherwise manage the waste in compliance with the conditions of this permit.

C. PLACEMENT REQUIREMENTS

The Permittee shall store all hazardous waste containers (totes) describer 40 CFR part 262 in a closed condition and on the transport vehicles until such time as they enter the bermed unloading bay for sampling and emptying. In addition, (totes) containers greater than 55 gallons of liquids shall remain on the transport vehicles until empty, to prevent the possibility of rupture or leak resulting from handling, or as specified in Attachment 7.

D. COMPATIBILITY OF WASTES WITH CONTAINERS

The Permittee shall assure that the ability of the container to contain the waste is not impaired as required by 40 CFR subsection 264.172.

MANAGEMENT OF CONTAINERS

The Permittee shall manage containers as required by NAC 444.9085 and 40 CFR subsection 264.173.

CONTAINMENT

The Permittee shall construct and/or maintain the containment system as required by NAC 444.9095 and 40 CFR subsection 264.175 and the attached plans and specifications, Attachment 5.

SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTES

The Permittee shall not locate containers holding ignitable or reactive wastes within 15 meters (50 feet) of the facility's property line.

SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES

1. Incompatible Wastes in Unwashed Containers. The Permittee shall not place hazardous waste in an unwashed container that previously held an incompatible waste or material.
2. Storage of Incompatible Wastes. The Permittee shall store containers of incompatible wastes as indicated in the attached plans, Attachment 7, as required by NAC 444.9105 and 40 CFR subsection 264.177(c).
3. Documentation. The Permittee must document compliance with section (1) of this condition as required by 40 CFR subsection 264.17(c) and place this documentation in the operating record (permit condition Part II.G.1.)

Correction to original Permit
See Page 25.1 for modification

ETICAM Permit
Page 25 of 32

PART IV - STORAGE IN TANKS

WASTE IDENTIFICATION

The Permittee may store the following hazardous wastes in tanks, subject to the terms of this permit:

- | | | |
|----|--|--------------------------------------|
| a. | Tank No(s). (Cyanide) | EPA Hazardous Waste No. |
| | <u>S-1 S-2 Cyanide Waste Water</u> | <u>F007, F008, F009, F011, F012,</u> |
| | <u>S-12 S-13 Cyanide-metal bearing</u> | <u>D003, D006, D007, D008, D011</u> |
| b. | Tank No(s). (Alkaline Waste Water) | EPA Hazardous Waste No. |
| | <u>S-3 thru S-6 Alkaline Waste Water</u> | <u>D002, D006, D007, D008, D011,</u> |
| | <u>S-14 S-15 Alkaline-metal bearing</u> | <u>F006</u> |
| c. | Tank No(s). (Acid) | EPA Hazardous Waste No. |
| | <u>S-7 thru S-10 Acid Waste Water</u> | <u>D002, D006, D007, D008, D011,</u> |
| | <u>S-16 thru S-28 Acid-metal bearing</u> | <u>F006, F019</u> |
| | <u>S-24 = S11.1 Delivery of spillage</u> | |
| | <u>acid/alkaline</u> | |
| d. | Tank No(s). | EPA Hazardous Waste No. |
| | <u>S-11 Delivery Spillage</u> | <u>F007, F008, F009, F011, F012,</u> |
| | <u>Collection basin, special</u> | <u>D003, D006, D007, D008, D011</u> |
| | <u>wastewater Cyanide</u> | |

PART IV - STORAGE IN TANKS

A. WASTE IDENTIFICATION

The Permittee may store the following hazardous waste in tanks,
subject to the terms of this permit:

<u>Tank No(s).</u>	<u>Waste Type</u>	<u>EPA Hazardous Waste No(s).</u>
a. B\CN-1 thru 6 B\CN-17 thru 28	Cyanide	F007, F008, F009, F011, F012, D002, D003, D004, D005, D006, D007, D008, D009, D010, D011
b. B-7 thru B-12 CS-11	Alkaline	D002, D003, D004, D005, D006, D007, D008, D009, D010, D011 F006
c. A-13 thru A-16 CS-10	Acid	D002, D004, D005, D006, D007, D008, D009, D010, D011, F006, F019, K062
d. E-3 thru E-8	Treated Acid or Alkali	D004, D005, D006, D007, D008, D009, D010, D011, F006, F007, F019, K062

B. DESIGN AND CONSTRUCTION OF TANKS

The Permittee shall construct, modify, and maintain all tanks in accordance with the plans and specifications in Attachment 10. The Permittee shall maintain the minimum shell thickness specified below at all times to ensure sufficient structural strength.

<u>Tank No(s).</u>	<u>Minimum Shell Thickness (Inches)</u>
a. <u>S-1 thru S-2</u>	<u>0.94</u>
b. <u>S-3 thru S-6</u>	<u>0.94</u>
c. <u>S-7 thru S-10</u>	<u>0.94</u>
d. <u>S-11 thru S-12</u>	<u>0.63</u>
e. <u>S-13 thru S-20</u>	<u>0.63</u>
f. <u>S-21 thru S-28</u>	<u>0.63</u>
g. <u>S-29</u>	<u>0.94</u>

The existing (April, 1987) maximum inventory of hazardous waste in storage/treatment at any one time is estimated to be (158,664) 170,719 gallons, which shall be the maximum allowable storage volume. The expanded volume will be approximately 340,000 gallons of liquids and 2,000 cubic yards (403,000 gallons) of sludge.

C. PROTECTION FROM OVERFILLING

The Permittee shall prevent overfilling of tanks by the methods specified in Attachment 10 and summarized below.

<u>Tank No(s).</u>	<u>Minimum Shell Thickness (Inches)</u>
a. <u>S-1 thru S-29</u>	<u>Liquid level indicator which signals when tank is full to prevent over-filling.</u>

D. PROTECTION FROM CORROSION

The Permittee shall protect tanks from accelerated corrosion, erosion, and abrasion as specified in Attachment 10 and summarized below.

<u>Tank No(s).</u>	<u>Type of Protection</u>
a. <u>S-1 thru S-8</u>	<u>Polypropylene</u>
b. <u>S-9 thru S-10</u>	<u>Polyvinyl Chloride</u>
c. <u>S-11 thru S-(29)26</u>	<u>Polypropylene</u>
d. <u>S-27 - S-28</u>	<u>Polyvinyl chloride</u>
e. <u>S-30 - S-34</u>	<u>Polypropylene</u>
f. <u>S-35</u>	<u>Polyethylene</u>

(See Section 8, Table 8.2 for new tank designations)

SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTES

1. Special Requirements. The Permittee shall not place ignitable or reactive waste in a tank unless the procedures described in Attachment 8 are followed.
2. Documentation. The Permittee shall document compliance with the above permit condition as required by NAC 444.8895 and 40 CFR subsection 264.17(c) and place this documentation in the operating record (permit condition Part II.G.1).
3. Buffer Zones. The Permittee shall comply with the buffer zone requirements for all tanks as listed in Table 2-2 through 2-6 of the National Fire Protection Association's "Flammable and Combustible Liquids Code, 1981".

F. SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTE

1. Incompatible Waste Precautions. The Permittee shall not place incompatible wastes in the same tank or place hazardous waste in a tank that previously held an incompatible waste or material unless the procedures specified in Attachment 9 are followed.
2. Documentation. The Permittee shall document compliance with the above permit condition as required by NAC 444.8895 and 40 CFR subsection 264.17(c) and place this documentation in the operating record (condition Part II.G.1).

PART V- TREATMENT IN TANKS

A. WASTE IDENTIFICATION

The Permittee may treat the following hazardous wastes in tanks, subject to the terms of this permit:

a. Tank No(s). (Cyanide)

T-3 _____

EPA Hazardous Waste No.

F007, F008, F009, F011, F012

D003, D006, D007, D008, D011

b. Tank No(s). (Alkaline)

T-1 T-4 _____

EPA Hazardous Waste No.

D002, D006, D007, D008, D011,

T-2 _____

F006, F019

c. Tank No(s). (Acid)

T-1 T-4 _____

EPA Hazardous Waste No.

D002, D006, D007, D008, D011,

T-2 _____

F006, F019

d. Tank No(s). (Clarifiers)

C-1 C-2 (C-4) _____

EPA Hazardous Waste No.

(All of the Above Waste Code
Numbers)

PART V - STORAGE IN TANKS

A. WASTE IDENTIFICATION

The Permittee may treat the following hazardous waste in tanks, subject to the terms of this permit:

<u>Tank No(s).</u>	<u>Waste Type</u>	<u>EPA Hazardous Waste No(s).</u>
a. T-3, T-6, T-7	Cyanide or Alkali	F007, F008, F009, F011, F012, D002, D003, D004, D005, D006, D007, D008, D009, D010, D011
b. T-1, T-2, T-4, T-5, T-8, T-9	Acid or Alkaline	D002, D003, D004, D005, D006, D007, D008, D009, D010, D011 F006
c. C-1 thru C-4	Clarifiers	All of the above waste code numbers
d. N-1 thru N-2 S-29.1/29.2	Neutralization & Final treatment	All of the above waste code numbers
e.	Evaporators/ Crystallizers	All of the above waste code numbers

P. DESIGN AND CONSTRUCTION OF TANKS

The Permittee shall construct, modify, and maintain all tanks in accordance with the plans and specifications in Attachment 10. The Permittee shall maintain the minimum shell thickness specified below at all times to ensure sufficient structural strength.

	<u>Tank No(s).</u>	<u>Minimum Shell Thickness (Inches)</u>
a.	<u>T-1</u>	<u>0.47</u>
b.	<u>T-2</u>	<u>0.47</u>
c.	<u>T-3</u>	<u>0.47</u>
d.	<u>T-4</u>	<u>0.47</u>
e.	<u>C-1</u>	<u>0.94</u>
f.	<u>C-2</u>	<u>0.94</u>

C. PROTECTION FROM OVERFILLING

The Permittee shall prevent overfilling of tanks by the methods specified in Attachment 10 and summarized below.

	<u>Tank No(s).</u>	<u>Type of Control</u>
a.	<u>T-1 thru T-4</u>	<u>Liquid level indicator which signals</u>
b.	<u>C-1 and C-2</u>	<u>when tank is full to prevent over-</u>
		<u>topping.</u>

D. PROTECTION FROM CORROSION

The Permittee shall protect tanks from accelerated corrosion, erosion, and abrasion as specified in Attachment 10 and summarized below.

<u>Tank No.(s).</u>	<u>Type of Protection</u>
a. T-1 (thru T-4) & T-3	<u>PVC steel armoring, PVC lining</u>
b. (C-1) T-2 and (C-2) T-4	<u>Fiberglass Polypropylene</u>

E. TREATMENT OF WASTES IN TANKS

The Permittee shall treat hazardous wastes as specified in the application, and in accordance with NAC 444.9115 and 444.9120 and 40 CFR subsection 264.191 and 264.192.

F. SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTES

1. Special Requirements. The Permittee shall not place ignitable or reactive waste in a tank unless the procedures described in Attachment 8 are followed.
2. Documentation. The Permittee shall document compliance with the above permit condition as required by NAC 444.8895 and 40 CFR subsection 264.17(c) and place this documentation in the facility operating record (permit condition Part II.G.1).

SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTE

1. Incompatible Waste Precautions. The Permittee shall not place incompatible wastes in the same tank or place hazardous waste in a tank that previously held an incompatible waste or material unless the procedures specified in Attachment 9 are followed.
2. Documentation. The Permittee shall document compliance with; the above permit condition as required by NAC 444.8895 and 40 CFR subsection 264.17(c) and place this documentation in the operating record (permit condition Part II.G.1).

LIST OF ATTACHMENTS

1. Waste Analysis Plan
2. Inspection Schedule
3. Training Outline
4. Contingency Plan
5. Storage Area Plans and Specifications
6. Closure Plan.
7. Procedures for Handling Reactive or Ignitable, or Incompatible Waste in Containers
8. Procedures for Handling Reactive or Ignitable Wastes in Tanks
9. Procedures for Handling Incompatible Wastes in Tanks
10. Tank Plans and Specifications

WASTE ANALYSIS PLAN

3.00

ETICAM
Fernley, Nevada

3.10 INTRODUCTION

3.11 PLAN OBJECTIVE

The objective of this waste analysis plan is to specify a sampling, testing and evaluation system which will ensure that waste materials accepted at ETICAM are safely handled, stored and treated.

Specifically the plan is intended to:

- Prevent the mixing of incompatible wastes.
- Insure that incoming waste materials are stored in the appropriate areas.
- Prevent the acceptance of materials which ETICAM is not permitted to accept.
- Insure that accepted waste streams are adequately and properly treated.

Sampling and analytical procedures necessary to achieve these objectives are described in the following subsections.

3.12 GENERAL APPROACH

Waste analysis shall consist of two separate activities. Prior to the shipment of any hazardous waste to ETICAM, a chemical and physical analysis of a representative sample of the waste shall be or shall have been previously obtained. The analysis will contain all of the information which must be known to insure that Eticam is permitted to and capable of accepting the waste shipment.

The specific waste stream analysis information to be required is specified in the following sections.

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A (complete) description of the generation process and the characteristics of the waste generated, based upon the generator's knowledge of the waste and upon laboratory analysis conducted by ETICAM will be required by the generator (ETICAM at the generator's cost prior to acceptance of shipment.)

This analysis will include the following data:

Note: The rationale and test method for each requested parameter will be performed in accordance with SW 846, Standard Methods for Waste water Analysis, or by other modified methods approved by the NDEP.

These Parameters are as follows:

<u>Parameter</u>	<u>Rationale</u>	<u>Test Method</u>
Physical State at 25 degree C	Mechanical capacity of facility to handle material	Visual Inspection (See Appendix J)
# of phases	Indicator of organics unacceptable to facility	Visual Inspection (See Appendix J)
Specific Gravity	Mechanical capacity of facility to handle material	Hydrometer (See Appendix J)
pH	Determination of approp- riate storage and required neutralization	pH meter (See Appendix J)
Color	Confirmation of shipment and sample integrity	Visual or Frequency % abs. (See Appendix J)
Metals (Dissolved) Arsenic Barium Cadmium Chromium (Copper) (Iron) Lead Mercury Nickel Selenium Silver	Determination of toxicity and treatability	Atomic Absorption or ICP (See Appendix J)

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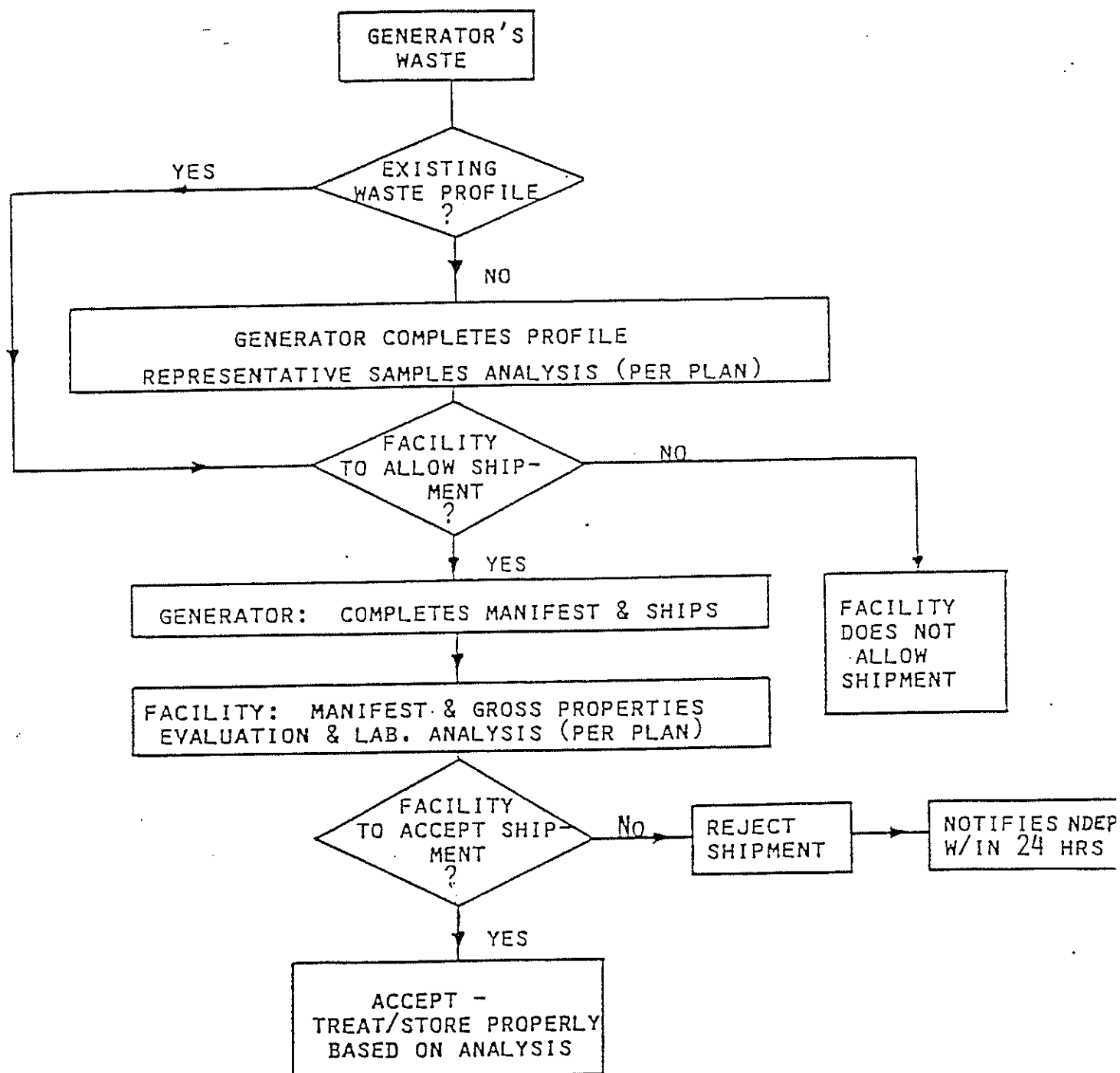
<u>Parameter</u>	<u>Rationale</u>	<u>Test Method</u>
Metals (Extracted if semisolid, solid, slurry, or sludge)		
Arsenic	Determination of toxicity and treatable	(See Appendix J)
Barium		
Cadmium		
Chromium		
Lead		
Mercury		
Selenium		
Silver		
<u>Parameter</u>	<u>Rationale</u>	<u>Test Method</u>
Acidity/Alkalinity	Determination of treatability and toxicity	Titration (See Appendix J)
CN	Determination of treatability and toxicity	CN distillation by ASTM standards (See Appendix J)
NH 3	Treatability	Ion Electrode (See Appendix J)
Total Organic Carbon	Organic Content	TOC Analyzer
<u>Organics</u>		
Endrin	Determination of acceptability If stated as being present by the generator	HPLC
Lindane		
Methoxychlor		
Toxaphene		
24D		
245TP		
Phenol		
PCB		

The sample shall be obtained by the generator in accordance with ("Coliwasa" as described in) "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," (SW 846), U. S. Environmental Protection Agency, Office of Solid Waste, Washington, DC 20460.

Then, upon receipt of the waste shipment at ETICAM, but prior to acceptance and offloading, ETICAM will sample and analyze a

Rev: 14 Oct 1989

FIGURE 3.1 WASTE ANALYSIS - GENERAL APPROACH



representative sample of the waste to verify the original analysis information (obtained prior to shipment), and to insure that the material is appropriate for storage and treatment at ETICAM.

This will consist of at least a gross properties evaluation and comparison previous laboratory analysis for specific parameters as specified in this plan. Wastewaters accepted for treatment may also be subjected to bench scale tests at the time of initial laboratory analysis.

The bench scale analysis to be performed may include but not be limited to the following:

<u>Parameter</u>	<u>Test</u>
Cyanides	Oxidation using NaOCl
Chromates	Reduction using FeCl 3
Heavy Metals	Coagulation using flocculants
Acids	Neutralization using NaOH or CaO
Alkali(nes)	Neutralization using HCl
Chelates	Destruction using proprietary technologies
Sludge Generation	Analysis for carbonates and sulfates
Metal recovery	Electrowinning techniques

Figure 3.1 illustrates the above approach and the fact all new sources and wastes from patron suppliers who have altered their generation process will be subject to more details analysis requirements than those waste sources routinely accepted. Generators who have altered their procedures or waste characteristics will be required to notify ETICAM of such in writing at least 72 hours in advance of any new

shipment. Waste shipments from a regular customer, who already supplied the necessary information on the generation process and waste characteristics, will typically only be subject to the sampling and analysis conducted upon receipt at the facility.

(Please note: Chemical and physical properties of the waste materials to be accepted at ETICAM are provided in Section 2.30. Table 2.1 lists the typical properties of the virgin materials of the waste types to be accepted.)

3.20 ANALYSIS PRIOR TO WASTE SHIPMENT

3.21 NEW SOURCES OR MODIFIED SOURCES

Before Eticam will allow shipment of waste material from a new or "modified" source, ETICAM will obtain the information indicated on the generator's waste profile sheet Figure 3.2 and shall require representative samples of the waste. Modified source refers to a generator who has been modified in any way which alters the waste characteristics.

3.21.1 GENERATOR WASTE PROFILE SHEET

All clients of ETICAM will be required to complete the following Generator Waste Profile Sheet for all hazardous waste streams to be shipped to ETICAM.

As a minimum for all waste streams, the generator must provide the following regarding characteristics of each waste stream:

- 1) sample of said waste stream
- 2) written and signed statement of how sample was taken and who took said sample

- 3) written and signed description of process generating said waste stream

For those generators which are regular clients of ETICAM and who have not modified their generation process, additional waste profile sheets and representative samples will be required only when the analysis indicated in 3.30 reveals significant discrepancies or where ETICAM, at its discretion, requests such information, but no less than once every (10 shipments) 12 months.

3.30 ANALYSIS UPON RECEIPT OF WASTE SHIPMENT ALL SOURCES

At this stage, ETICAM will have received a completed manifest, a waste profile sheet and a representative sample (at least on initial waste shipment which ETICAM will have analyzed as indicated in the preceding section) for the waste material arriving at the facility. The information provided will then be verified as described below.

3.31 MANIFEST EVALUATION

All incoming material must be accompanied by a manifest and a Land Ban Notification (figure 3.3) filled out in accordance with applicable state and federal rules and regulations.

An initial review of the manifest will be made to determine whether or not differences exist between the quantity or type of hazardous waste designated on the manifest or shipping paper, and the quantity or type of hazardous waste ETICAM actually receives.

ETICAM

2095 Newlands Dr. East
Fernley, Nevada 89408

FIGURE 3.2A

LAB USE ONLY

Log #

THIS FORM MUST ACCOMPANY SAMPLE

To Be Completed By Generator

COMPANY NAME:

ADDRESS:

SAMPLE IDENTIFICATION ON CONTAINER:

COLLECTION DATE:

TIME:

SAMPLING METHOD:

PRESERVATION USED: ☐ YES ☐ NO

IF YES, SPECIFY:

DESCRIPTION OF PROCESS GENERATING WASTE STREAM:

COMMENTS:

PROCESS & SAMPLE CERTIFICATION

I certify that I obtained the sample of waste material described in this form and the accompanying GENERATOR'S WASTE PROFILE or was present at or supervised the sampling and that it is a representative sample of the waste stream, and that the representations contained in this document are accurate.

NAME: _____ SIGNATURE: _____

TITLE: _____ DATE: _____

LAB USE ONLY

Received By: _____

Date: _____ Time: _____

Comments:



ETICAM

WASTE ACCEPTANCE LETTER

DATE:

ATTN:

ADDRESS:

Dear ,

In accordance with CFR 40 Subsection 264.12 Section B and our RCRA Part B Permit Section K.2., Notice to Generator: ETICAM of 2095 Newlands Drive East, Fernley, Nevada, a completely insured and licensed (Part B Permit) T.S.D. Facility will accept the following waste:

Customer:

Approval #:

Profile #:

Acceptance of this waste stream is contingent upon ETICAM's prior receipt of a physical and chemical analysis.

The sample must be representative of the waste streams being transported to ETICAM.

Sincerely,

RCRA LAND DISPOSAL RESTRICTION NOTIFICATION

Generator Name: _____ EPA ID# _____

Manifest Number: _____ Date of Shipment: _____

EPA Hazardous Waste Number: _____

This notification is hereby submitted to ETICAM in compliance with EPA regulations described in 40 CFR Part 268 which prohibits the land disposal of certain hazardous wastes, unless those wastes are treated to meet specified standards.

CHECK THE APPROPRIATE BLANK

_____ I am the initial generator of the untested hazardous waste described on the above manifest. This waste must be treated in order to meet the appropriate treatment standards set forth in 40 CFR 268 Subpart D.

_____ The waste identified above has been treated in compliance with the applicable performance standards specified in 40 CFR 268 Subpart D and/or the applicable prohibitions set forth in 40 CFR 268.36. " I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with treatment standards specified in 40 CFR Part 268 Subpart D. I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibilities of fine and imprisonment."

_____ The waste identified above is subject to a case by case extension under 40 CFR 268.5 or a national variance under 40 CFR Subpart C.

I hereby certify that all information submitted in this and all associated documents is complete and accurate to the best of my knowledge and information.

SIGNATURE _____

ETICAM personnel will look for significant manifest discrepancies which include, but are not limited to:

- variations greater than 10 percent by volume for bulk shipments;
- variations in piece count - for batch waste, and;
- stratification in a sample jar not otherwise expected.
- "Land Ban Notification" not included.

Significant discrepancies in type or obvious differences which can be detected by inspection or analysis.

In the event that a significant discrepancy exists, ETICAM personnel will attempt to reconcile the discrepancy with the waste generator or transporter. During the period of attempted reconciliation (not to exceed 24 hours) the shipment and the vehicle on which it was transported will be quarantined at the generator's expense in a parking area designated on the site plan.

In the event of any significant manifest discrepancy, the Nevada Division of Environmental Protection (NDEP) will be notified within 24 hours. If the manifest adequately describes the material from a patron supplier, shipment analysis will continue as follows:

3.32 GROSS PROPERTIES EVALUATION

A representative sample will be obtained and analyzed from all incoming bulk or (tote) container shipments ((each tote)) in accordance with the sampling procedures specified in Section 3.5 prior to discharge of the shipment from the vehicle into ETICAM's storage tanks. During this time, said vehicle will be retained in ETICAM's offloading sampling bays.

Said sample will be drawn into a (500 ml glass jar) sample container labeled with the following information:

- Generator's Name and Signature
- Sample Number
- Manifest Number
- Date and Time Collected
- Name of Collector

The sample will then be transferred to the lab and allowed to settle after which time a visual inspection is made to detect any gross contamination (e.g., stratification a separate layer, other than sludge or water (in the jar), might be indicative of the presence of a foreign material).

All samples will be evaluated for the following parameters:

<u>Parameter</u>	<u>Test Method</u>
Material phase (solid/Liquid/ semi-solid)	Visual
Layering	Visual
Colorimetric absorption at 3 frequencies for comparison with existing waste profile or Metals Analysis	Photometer
pH, aqueous only	pH meter
Specific Gravity	Hydrometer
Presence of free cyanide	Colorimetric
(Presence of chromates) Other metal analysis as required	Colorimetric or instrumental

This information will be compared with that indicated on the waste profile sheet and with that of prior representative sample analyses. If discrepancies are noted which suggest that ETICAM is not receiving the waste material represented, a representative sample of the waste shall be (submitted for detailed analysis) **further analyzed** to clarify the discrepancy.

If the discrepancy can not be clarified, the shipment will be rejected and NDEP will be (so) notified within 24 hours of the rejection.

3.50 SAMPLING METHODOLOGY

This section includes descriptions of procedures to be followed when sampling bulk and (tote) **container** shipments.

Following sampling, samples are to be immediately labeled with the following information:

Name of collector

signature of collector

Date and time of collection

Name of Generator

Manifest Number

Sample identification number

All pertinent sample information shall be recorded in a log book. The information shall include sample analysis and testing. Only trained, qualified personnel are to conduct sampling.

3.51 SAMPLING QUANTITIES

A (2-L) one liter sample will be collected for physical and chemical analysis. For certain determinations, larger samples may be necessary. See Figure 3.4 for volumes required.

3.52 PRESERVATION METHODS

Complete and unequivocal preservation of samples, whether domestic waste- water, industrial wastes, or natural waters, is a practical impossibility. Regardless of the sample nature, complete stability for every constituent never can be achieved. At best, preservation techniques only retard chemical and biological changes that inevitably continue after sample collection. Changes that take place in a sample are either chemical or biological.

Some determinations are more likely than others to be affected by sample storage before analysis. Certain cations are subject to loss by absorption on or ion exchange with, the walls of glass containers. These include aluminum, cadmium, chromium, copper, iron, lead, manganese, silver, and zinc, which are best collected in a separate clean bottle and acidified with nitric acid to a pH below 2.0 to minimize precipitation and absorption on container walls. However, metal concentrations are at relatively high levels in the incoming waste thus minimizing the impact of this phenomena.

Since pH may change significantly in a matter of minutes, (Determine) temperature and pH will be analyzed immediately.

Cyanide may be lost through oxidation. Color, odor, and turbidity may increase, decrease, or change in quantity. Sodium, silica, and boron

may be leached out of the glass container. Hexavalent chromium may be reduced to chromic ion.

The foregoing discussion is by no means inclusive. Clearly it is impossible to prescribe absolute rules for preventing all possible changes, but to a large degree the dependability of (water) any analyses rests on the experience and good judgment of the analyst.

a. Time Interval Between Collection and Analysis: In general, the shorter the time that elapses between collection of a sample and its analysis, the more reliable will be the analytical results. For certain constituents and physical values, immediate analysis in the field is required.

It is impossible to state exactly how much elapsed time may be allowed between sample collection and its analysis; this depends on the character of the sample, the analyses to be made, and the condition of storage. When the interval between collection and analysis is long enough to produce changes in either the concentration or the physical state of the constituent to be measured, follow the preservation practices given in (Figure) Table 3.3. Record time elapsed between sampling and analysis, and which preservative, if any, was added.

b. Preservation Methods: Sample preservation is difficult because almost all preservatives interfere with some of the tests. Immediate analysis is ideal. Storage at low temperature (4 degrees C) is perhaps the best way to preserve most samples until the next day. Use chemical preservatives only when they are shown not to interfere with the analysis being made. When they are used, add them to the

TABLE 3.3

TABLE 105.I. SUMMARY OF SPECIAL SAMPLING OR HANDLING REQUIREMENTS*

Determination	Container	Minimum Sample Size mL	Preservation	Maximum Storage Recommended/ Regulatory†
Acidity	P, G(B)	100	Refrigerate	24 h/14 d
Alkalinity	P, G	200	Refrigerate	24 h/14 d
BOD	P, G	1000	Refrigerate	6 h/48 h
Boron	P	100	None required	28 d/28 d
Bromide	P, G	—	None required	28 d/28 d
Carbon, organic, total	G	100	Analyze immediately; or refrigerate and add H_2SO_4 to pH < 2	7 d/28 d
Carbon dioxide	P, G	100	Analyze immediately	—/—
COD	P, G	100	Analyze as soon as possible, or add H_2SO_4 to pH < 2	7 d/28 d
Chlorine, residual	P, G	500	Analyze immediately	0.5 h/2 h
Chlorine dioxide	P, G	500	Analyze immediately	0.5 h/2 h
Chlorophyll	P, G	500	30 d in dark; freeze	30 d/—
Color	P, G	500	Refrigerate	48 h/48 h
Conductivity	P, G	500	Refrigerate	28 d/28 d
Cyanide:				
Total	P, G	500	Add NaOH to pH > 12, refrigerate in dark	24 h/14 d
Amenable to chlorination				
Fluoride	P, G	500	Add 100 mg $Na_2S_2O_3/L$	—/—
Grease and oil	P	300	None required	28 d/28 d
	G, wide-mouth calibrated	1000	Add H_2SO_4 to pH < 2, refrigerate	28 d/28 d
Hardness	P, G	100	Add HNO_3 to pH < 2	6 months/6 months
Iodine	P, G	500	Analyze immediately	0.5 h/—
Metals, general	P(A), G(A)	—	For dissolved metals filter immediately, add HNO_3 to pH < 2	6 months/6 months
Chromium VI	P(A), G(A)	300	Refrigerate	24 h/48 h
Copper by colorimetry*	P(A), G(A)	500	Add HNO_3 to pH < 2, 4°C	28 d/28 d
Mercury	P(A), G(A)	500	Analyze as soon as possible or add H_2SO_4 to pH < 2, refrigerate	7 d/28 d
Nitrogen:				
Ammonia	P, G	500		

Reference: STANDARD METHODS
For the Examination of Water and Wastewater

SAMPLE COLLECTION & PRESERVATION

TABLE 3.3 (Continued)

Nitrate	P, G	100	Analyze as soon as possible or refrigerate; or freeze at -20°C	48 h/48 h
Nitrate + nitrite	P, G	200	Add H ₂ SO ₄ to pH < 2, refrigerate	none/28 d
Nitrite	P, G	100	Analyze as soon as possible or refrigerate; or freeze at -20°C	none/48 h
Organic, Kjeldahl	P, G	500	Refrigerate; add H ₂ SO ₄ to pH < 2	7 d/28 d
Odor	G	500	Analyze as soon as possible; refrigerate	6 h/—
Organic compounds:				
Pesticides	G(S), TFE-lined cap	—	Refrigerate; add 100 mg Na ₂ S ₂ O ₃ /L if residual chlorine present	7 d/7 d
Phenols	P, G	500	Refrigerate, add H ₂ SO ₄ to pH < 2	* /28 d
Purgeables by purge and trap	G, TFE-lined cap	50	Refrigerate; add 100 mg Na ₂ S ₂ O ₃ /L if residual chlorine present	7 d/14 d
Oxygen, dissolved:	G, BOD bottle	300		
Electrode			Analyze immediately	0.5 h/1 h
Winkler			Titration may be delayed after acidification	8 h/8 h
Ozone	G	1000	Analyze immediately	0.5 h/—
pH	P, G	—	Analyze immediately	2 h/2 h
Phosphate	G(A)	100	For dissolved phosphate filter immediately; refrigerate; freeze at -10°C	48 h/48 h
Salinity	G, wax seal	240	Analyze immediately or use wax seal	6 months/—
Silica	P	—	Refrigerate, do not freeze	28 d/28 d
Sludge digester gas	G, gas bottle	—		—
Solids	P, G	—	Refrigerate	7 d/7-14 d
Sulfate	P, G	—	Refrigerate	28 d/28 d
Sulfide	P, G	100	Refrigerate; add 4 drops 2N zinc acetate/100 mL	28 d/28 d
Taste	G	500	Analyze as soon as possible; refrigerate	24 h/—
Temperature	P, G	—	Analyze immediately	—/—
Turbidity	P, G	—	Analyze same day; store in dark up to 24 h	24 h/48 h

* See text for additional details. For determinations not listed, use glass or plastic containers; preferably refrigerate during storage and analyze as soon as possible. Refrigerate = storage at 4°C, in the dark. P = plastic (polyethylene or equivalent); G = glass; G(A) or P(A) = rinsed with 1 + 1 HNO₃; G(B) = glass, borosilicate; G(S) = glass, rinsed with organic solvents.

† Environmental Protection Agency, Proposed Rules, *Federal Register* 44, No. 244, Dec. 18, 1979.

sample bottle initially so that all sample portions are preserved as soon as collected. No single method of preservation is entirely satisfactory; choose the preservative with due regard to the determinations to be made. All methods of preservation may be inadequate when applied to suspended matter. Because formaldehyde affects so many analyses, do not use it.

Methods of preservation are relatively limited and are intended generally to retard biological action, retard hydrolysis of chemical compounds and complexes, and reduce volatility of constituents.

Preservation methods are limited to pH control, chemical addition, refrigeration, and freezing. Table Fig. 3.3 lists preservation methods by constituent.

Reagent water used in all analytical work will meet the standards specified in SW 846.

(REAGENT WATER (TENTATIVE)*)

(One of the most important aspects of analysis is the preparation of reagent grade water to be used for dilution of reagents and for blank analysis. In general, reagent-grade water implies distilled or deionized water with no detectable concentration of the compound or element to be analyzed at the detection limit of the analytical method. The quality of the water required is related directly to the analysis being made. Requirements for water quality may differ for organic, inorganic, and microbiological testing. This section provides general guidelines for the preparation of reagent water.

*Approved as Tentative by Joint Editorial Board, 1985.

Rev: 14 Oct 1989

1. Distilled Water

Prepare reagent-grade distilled water by distilling water from an all-borosilicate-glass or fused-quartz or tin still. To remove ammonia from distilled water distill it from an acid solution. Remove CO₂ by boiling the water for 15 min. and cooling rapidly to room temperature, exclude atmospheric CO₂ by using a tube containing soda line for a commercially available CO₂ -removing agent. Boiling the water may add other impurities to it by leaching from the container using for boiling. Verify the quality of distilled water by measuring conductivity, which should be <1.0 umho/cm.

2. Deionized Water

Prepare reagent-grade deionized water by passing tap water through a mixed-bed exchanger, consisting of strong anion and strong cation resins mixed together. When the system does not run continuously, discard the first bed volume of product water from the ion-exchange bed. Water conductivity should be <0.2 umho/cm.

3. Purification of Water for Organics Analysis

The most common technique for removing organics from reagent water is passage of the water through a bed of granular activated carbon. To achieve the lowest level of organic contamination do this following deionization, but note that the conductivity of the water may be degraded.

4. Regent Water Quality

Listed below are several guidelines for reagent water quality. Use Type I water in test methods requiring minimal

interference and maximum precision and accuracy. When analyses are to be conducted near the detection limit of the method, check Type I water at the time of use to verify quality. Type II water may be used for general laboratory testing. Type III water may be used for glassware, and as feedwater for production of higher-grade waters.

Type I water cannot be stored without significant degradation; produce it continuously and use it immediately after processing. Type II water may be stored, but keep storage to a minimum and provide quality consistent with the intended use. Store only in materials that protect the water from contamination, for example, TFE and glass for organics analysis or plastic for metals. Store Type III water in materials that protect the water from contamination.

Any method of preparation of reagent water is acceptable provided that the requisite quality can be met. Reverse osmosis, distillation, and deionization all can produce reagent water when used in the proper arrangement, Ultrafiltration and/or UV treatment also may be employed as part of the process.

Type I reagent water typically is prepared by distillation of feed water having a maximum conductivity of 20 umhos/cm (25 degrees C) followed by polishing with mixed-bed deionizers and passage through a 0.2 um membrane filter. The mixed beds typically add small amounts of organic matter to the water, especially if they are fresh beds. Resistivity of Type I water should be >10 megohm-cm(25 degrees C), measured in-line. Resistivity measurements will not detect non-ionized or weakly ionized contaminants or provide an accurate assessment of ionic contaminants at the micro-gram-per-liter level.

Thus, make separate measurements of such constituents as TOC, SiO₂, and bacterial counts.

Type II water typically is produced by distillation or deionization. Resistivity should be >1 megohm-cm (conductivity <1 umho/cm at 25 degrees C). Observe the same precautions about measurements of other contaminants.

Type III water should have a minimum resistivity of 0.1 megohm-cm (conductivity <10 umho/cm at 25 degrees C).

Other contaminants in reagent water are listed below, but these are not intended to be absolute specifications.

pH cannot be measured accurately on Type I or Type II water without contaminating it. Measure other constituents as required for individual tests.

For details on preparing water for microbiological tests see Part 900.

Quality Parameter	Type I	Type II	Type III
Bacterial (CFU/100 mL)	<100	<1000	<10 000
pH	NA	NA	5-7
Resistivity (megohm-cm at 25 deg C)	10	1	0.1
Conductivity (umho/cm at 25 deg C)	<0.1	1	10
SiO ₂ (mg/L)	<0.01	<0.1	<1
Total solids (mg/L)	0.1	1	5
Total organic carbon (mg/L)	<0.05	<0.2	<1

3.53 PREVENTION OF CROSS CONTAMINATION

Samples will be transported and stored in clean jars with tightly closed screw lids to prevent cross contamination. For effluent samples, each jar will be carefully washed before use and rinsed three times with sample solution before sample is taken.

3.54 SAMPLING OF VACUUM TRUCKS

(The California Department of Health (1980) describes the general sampling procedure:)

Sampling a vacuum truck requires the person collecting the sample to climb on the truck and walk along a narrow catwalk. In some trucks it requires climbing access rungs to the tank hatch. These situations present accessibility problems to the sample collector, who must (usually) sometimes wear full protective sampling gear. Preferably two persons should perform the sampling: one person should do the actual sampling and the other should hand the sampling device, stand ready with the sample container and help deal with; any problems. The person taking the sample (container) should position himself to collect sample only after the truck driver has opened the tank hatch. The tank (is usually) may be under pressure or vacuum.

1.
 - a. Let the truck driver open the hatch.
 - b. Using protective sampling gear, assume a stable stance on the tank catwalk or access rung to the hatch.
 - c. Collect a sample through the hatch opening.
 - d. If the tank is not horizontal, take one additional sample each from the rear and front clean out hatches and combine all three samples in one container.
 - e. (When necessary, carefully take sediment samples from the tank through the drain spigot.)
A representative sample of any layers, phases or solids on the bottom will be taken with a Composite Liquid Waste Sampler (COLIWASA).
2. (Secure) Open the stopper in the (bottle) COLIWASA orifice.

3. Lower the (bottle) COLIWASA to the bottom of the tank and close the stopper. (Give the cord a quick jerk to disengage the stopper. Bubbles will slowly rise to the surface indicating that the stopper is off and the bottle is filling. Once bubbling stops, slowly raise the bottle.) Pour entire contents into a clean bucket. Several sample draws may be needed to provide an adequate sample.
- (4. Follow direction in Step 3, but lower to approximately the middle of the tank. Pour contents into the sample bucket.)
- (5. Follow directions in Step 3, but position sampler near the liquid into a clean glass sample bottle.)
- (6.) 4. Swirl the bucket contents to destratify, and pour liquid into a clean (glass) sample (bottle) container.
- (7.) 5. Cap the sample container, attach label and seal; record in field log book.
- (8.) 6. Clean sampler on-site with water and wash into the spill collection sump. (Store used rags in plastic bags for subsequent disposal.)
- (9.) 7. Analyze sample in accordance with Waste Analysis Plan.

3.55 SAMPLING CONTAINERS OF LIQUIDS

Shipments of containers of liquids, including portable tanks and drums will be sampled with a COLIWASA as described in section 3.54. Each and every container will be sampled. The COLIWASA will allow a total profile from top to bottom of the container. The samples will then be composited in the laboratory into groups of like waste; For instance, a shipment with multiple containers of the same material will be composited for sample verification. Individual container samples will be analyzed in the event a major discrepancy is found from the marketing sample, and the analysis will be performed as needed to determine the source of the discrepancy. The Process Chemist will

determine what analysis is needed based on the information on the waste profile and his observation of the basic parameters of the sample; ie. color, pH, specific gravity, and presence of layering.

3.56 SAMPLING CONTAINERS OF SOLIDS

Containers holding solids will vary from small pails and drums, to bins containing 1 to 20 cubic yards. Representative samples will be taken of each container. Containers less than one cubic yard in capacity will be sampled with an auger or thief at one or more locations. Larger containers, containing more than one cubic yard will be sampled in multiple locations; one representative sample from each cubic yard spaced evenly over the area of the container.

Samples from containers of four cubic yards or less will be composited into groups of like material. Each container larger than four cubic yards will be analyzed separately.

Analysis of solid samples will essentially be the same as liquids, except that an acid extraction will be performed for metal constituents, and a 10 % solution of the sludge in distilled water will be made for evaluating the pH. Since the time required for an acid digestion is too lengthy to hold a truck pending acceptance of a load, only the basic physical characteristics of pH, specific gravity, color, consistency, and presence of free liquids will be performed. The final analysis will be used at a later date to determine credit and penalty charges to the generator for undesirable constituents and valuable metals.

3.60 ANALYSIS OF WASTE GENERATED ON SITE

Waste residue or materials generated on site as a result of waste processing or treatment operations will be evaluated for compliance with RCRA Land Disposal Restrictions.

First the waste will be classified to determine if it falls under a hazardous waste code subject to Land Ban Restrictions. Restricted wastes which are not reclaimed and are destined for disposal will be analyzed in accordance with the requirements specified in Table 3.4.

(3.60) 3.70 QUALITY ASSURANCE PLAN

(The following quality assurance plan shall be instituted to ensure that waste analysis data is precise, accurate, and representative.

The plan covers quality control sampling, analysis, and data management.)

The following plan has been established so that the various Governmental Agencies, ETICAM's customers, and the plant staff can be certain that all laboratory results are accurate, reliable, timely, and meaningful.

Quality Control has been defined as the steps undertaken in the laboratory to insure that data produced is generated within known probability limits of accuracy and precision.

Quality Assurance on the other hand consists of the system of documentation that provides confirmation of the quality Control Program.

TABLE 3.4

FINAL TREATMENT STANDARDS FOR FIRST- AND SECOND-THIRD WASTES

Hazardous waste description	Constituents of concern	Nonwastewater		Wastewater, total composition, mg/L ¹	Effective date ²
		Total composition, mg/kg ¹	TCLP, mg/L ¹		
F006 — Wastewater treatment sludges from electroplating operations	Cadmium	—	0.066	†	8/8/88 for metals; 7/8/89 for cyanides; 6/7/89 for injection of nonwastewaters
	Chromium (total)	—	5.2		
	Lead	—	0.51		
	Nickel	—	0.32		
	Silver	—	0.072		
	Cyanides (Total)	590	—		
	Cyanides (Amenable)	30	—		
F007 — Spent cyanide plating bath solutions from electroplating operations.	Cadmium	—	0.066	—	7/8/89; 6/8/91 for injection
	Chromium (Total)	—	5.2	0.32	
	Cyanides (Total)	590	—	1.9	
	Cyanides (Amenable)	30	—	0.10	
	Lead	—	0.51	0.04	
	Nickel	—	0.32	0.44	
	Silver	—	0.072	—	
F008 — Plating bath sludges from the bottom of plating baths from electroplating operations where cyanides are used in the process.	Cadmium	—	0.066	—	7/8/89
	Chromium (Total)	—	5.2	0.32	
	Cyanides (Total)	590	—	1.9	
	Cyanides (Amenable)	30	—	0.10	
	Lead	—	0.51	0.04	
	Nickel	—	0.32	0.44	
	Silver	—	0.072	—	
F009 — Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	Cadmium	—	0.066	—	7/8/89
	Chromium (Total)	—	5.2	0.32	
	Cyanides (Total)	590	—	1.9	
	Cyanides (Amenable)	30	—	0.10	
	Lead	—	0.51	0.04	
	Nickel	—	0.32	0.44	
	Silver	—	0.072	—	
F010 — Quenching bath sludge from oil baths from metal heat treating operations where cyanides are used in the process.	Cyanides (Total)	1.5	—	1.9	6/8/89
	Cyanides (Amenable)	—	—	0.10	
F011 — Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	Cadmium	—	0.066	—	7/8/89 ⁶
	Chromium (Total)	—	5.2	0.32	
	Cyanides (Total)	110	—	1.9	
	Cyanides (Amenable)	9.1	—	0.10	
	Lead	—	0.51	0.04	
	Nickel	—	0.32	0.44	
	Silver	—	0.072	—	

TABLE 3.4 (Cont.)

FINAL TREATMENT STANDARDS FOR FIRST- AND SECOND-THIRD WASTES—Continued

Hazardous waste description	Constituents of concern	Nonwastewater		Wastewater, total composition, mg/L ¹	Effective date ²
		Total composition, mg/kg ¹	TCLP, mg/L ¹		
F012 — Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.	Cadmium	—	0.066	—	7/8/89 ⁶
	Chromium (Total)	—	5.2	0.32	
	Cyanides (Total)	110	—	1.9	
	Cyanides (Amenable)	9.1	—	0.10	
	Lead	—	0.51	0.04	
	Nickel	—	0.32	0.44	
	Silver	—	0.072	—	
K061 — Emission control dust/sludge from the primary production of steel in electric furnaces — high-zinc subcategory ($\geq 15\%$ zinc) interim standards effective until 8/8/90	Cadmium	—	0.14	†	8/8/88; 6/7/89 for injection of nonwaste-waters
	Chromium (total)	—	5.2		
	Lead	—	0.24		
	Nickel	—	0.32		
High-zinc subcategory effective after 8/7/90	-----No land disposal based on recycling-----			†††	8/8/90; 6/7/89 for injection of nonwaste-waters
Low-zinc subcategory (< 15% zinc)	Cadmium	—	0.14	†	8/8/88; 6/7/89 for injection of nonwaste-waters
	Chromium (total)	—	5.2		
	Lead	—	0.24		
	Nickel	—	0.32		
K062 — Spent pickle liquor generated by steel finishing operations at facilities with-in the iron and steel industry (SIC codes 331 and 332)	Chromium (total)	—	0.094	0.32	8/8/88;
	Nickel	—	—	0.44	8/8/90 for
	Lead	—	0.37	0.04	injection

¹All concentrations are maximums for any single grab sample, unless otherwise noted.

²Effective date applies to all forms of land disposal, including underground injection, unless otherwise noted.

⁶F011 and F012 nonwastewaters are subject to an interim cyanide standard (590 mg/kg total cyanide and 30 mg/kg amenable cyanide) from July 8, 1989 until December 8, 1989. Effective December 8, 1989, the final cyanide standard of 110 mg/kg total cyanide and 9.1 mg/kg amenable cyanide become effective. Effective date for F011 and F012 wastewater standards is 7/8/89.

†Wastewater treatment standards have not been established for these wastes; therefore, wastewaters are subject to the soft-hammer prohibitions.

†††Wastewater treatment standards have not been established for these wastes. Unless standards are promulgated before May 8, 1990, these wastewaters will be subject to the hard-hammer prohibitions on this date.

Source: McCoy and Associates, Inc., adapted from 53 FR 31217-31221 and 54 FR 26649-26652.

3.71 The Quality Assurance program is typified by the system of checks and balances maintaining sample identity and integrity. Samples are given a unique laboratory number immediately upon receipt; this number is in addition to any and all other types of identification and is used for the accumulation of laboratory data, the preparation of reports and final filling. A bound log is maintained listing sample number, date, time, tests requested, analyst and date and time of completion.

All instruments are standardized at least once per shift, the "printout" is filed by date and time and like all other data maintained in the active files for a minimum of three years.

For those instruments that don't generate a "printout" (e.g. pH Meter, Ion Selective Electrodes, etc.) bound notebooks are maintained indicating Date, Time, Results of Standardization as well as all tests performed and Analyst.

Without going into great detail, files are maintained in such a fashion that at any given time the complete history of any sample may determine in a matter of minutes. These files would indicate the source of the sample, the results of any test performed, when the instrument was standardized (with all Standards traceable to NBS), the analyst that performed the tests and when the results were completed.

3.72 Another aspect of proper documentation is the maintenance of an active manual of acceptable test procedures. All procedures utilized by the Analytical Laboratory are either taken directly from recognized methods established by the various regulatory agencies or

adapted where required by special circumstances of sample nature from such methods.

3.73 All instruments are calibrated one or more times per shift using Certified Standards. In addition, "blind" samples are submitted for complete analyses periodically. On a routine basis "spikes", "replicates", etc. are analyzed to generate statistical data to determine accuracy and precision of methods, equipment and personal bias of the various operators.

In order to insure that sampling is being performed in accordance with the appropriate procedures; sampling procedures will be included in the training program and ETICAM management will actively supervise sampling at least monthly with each employee performing this task.

To assure that analysis by on-site and outside laboratories is accurate, ETICAM will obtain copies of available state and/or federal (laboratory) certifications for these laboratories, and will, at least annually, split samples between laboratories as a check on their analysis accuracy. Analysis conducted on-site by ETICAM will be duplicated at a qualified laboratory at least once every six months. (All waste analysis data will be maintained on-site for at least three years from the date of waste acceptance. Management will review waste analysis records weekly to assure they are legible and properly maintained.)

(As a check on overall treatment efficiency and therefore, upon the entire operation, the final effluent will be sampled and analyzed in

accordance with all federal, state, and local pretreatment standards
(Treated effluent shall be analyzed for compliance with the following
parameters:

- | | | |
|-------------|-------------|--------------------------|
| (1. pH | 5. copper | 9. silver) |
| (2. cyanide | 6. cadmium | 10. iron) |
| (3. lead | 7. nickel | 11. nitrite) |
| (4. zinc | 8. chromium | 12. free chlorine) |
| | | (13. settleable solids) |

(3.80 ANALYSIS METHODS

Analysis provided for in the preceding sections shall be conducted in
accordance with the standard methods described in the following
reference sources:

1. US EPA, 1982, Test Methods for Evaluating Solid Waste -
Physical/Chemical Methods. SW-846, 2nd Edition. Office of Solid
Waste and Emergency Response, Washington, D.C.

2. American Public Health Association, 1975, Standard
Methods for the Examination of Water and Wastewater, American Public
Health Association, Inc., 14th Edition, 1193 pp. (or the most recent
edition).

3. 40 CFR part 261 Appendix I, Appendix II, and Appendix
III.)

3.80 ANALYTICAL METHODS

All physical tests and chemical analyses are to be performed in
accordance with the following procedures unless alternate methods are
approved by the Nevada Department of Environmental Protection:

- 1. TEST METHODS FOR EVALUATING SOLID WASTE, U.S. Environmental**
Protection Agency, SW - 846, Third Edition (1986).
- 2. STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER,**
APHA, AWWA, WPCF, 16th Edition (1985).
- 3. CFR 40 Part 261; Appendix 1, Appendix 2 and Appendix III.**

NOTE: In the event of revision of any of the above sources, the most

recent revision shall apply where applicable.

ETICAM
Fernley, Nevada5.10 GENERAL

The purpose of this plan is to describe and delineate the procedures that will be implemented by ETICAM personnel for inspecting their facility. Routine inspections are required at this facility to detect malfunctions, deterioration, operator errors, leaks, and discharges which could cause a threat to human health and/or environmental damage. It is necessary to conduct facility inspections routinely to identify problems and initiate corrective actions before they can create a threat to human health or the environment.

This plan identifies all areas and items to be routinely inspected and fixes the minimum frequency of said inspections. This plan shall be maintained at the facility at all times, and updated as required whenever any changes take place at the facility.

5.11 CORRECTIVE MEASURES

Any conditions noted during the inspections dictated by this plan such as deterioration, malfunctions of equipment or structures, shall be remedied within a

scheduled amount of time such that a threat to human health or the environment will not occur. Any conditions noted where damage has already occurred or where an imminent hazard is noted will be corrected immediately.

5.12 INSPECTION LOG

The results of all inspections dictated by this plan shall be entered into the facility Inspection Log section of the Operating Record. Each entry shall include the date and time of the inspection, the name of the inspector, a description of the equipment or structures being inspected, a notation of the observations made, an indication as to whether or not corrective action shall be initiated, and the date and nature of any such repairs or other remedial actions.

5.13 NOTIFICATION

The Director of the Nevada DEP will be notified by phone, followed by a written report if any of the following occur:

- 1) Release of hazardous wastes other than small leakages which can be immediately contained and cleaned up.

- 2) Fires involving hazardous wastes.

- 3) Explosions involving hazardous wastes.
- 4) Groundwater contamination resulting from hazardous waste incidents.

5.20 INSPECTION SCHEDULE

The facility will be inspected on a regular basis and in accordance with the following schedule:

<u>Area</u>	<u>Inspection Frequency</u>	<u>Items to be Inspected</u>	<u>Inspection Log</u>
Receiving Area	Once/Day	Piping systems hose couplers, valves, tanks, berms, containments, sumps	G
Sump Inspection	Once/Week	Activation of sump audio alarm	H
Waste Handling (concentrate storage)	Once/Operating Shift	Tanks, piping systems, tank level indicators, pumps, valves, sump level sensors, containments, sumps	I
Chemical Storage*	Once/Operating Shift	Tanks, piping systems, filling manifold, tank level indicators, pumps, valves, sump levels sensors, berms, containments, sumps	J
Waste Processing Area	Once/Operating Shift	Batch treatment tanks, pumps, valves, level sensors, sludge tanks, chemical dosing tanks, neutralization equipment, final purification equipment, drainage pit level sensors, control equipment, berms, containment, and sumps	K
Sludge Handling	Once/Operating Shift	Filter presses, piping systems, valves, level sensors, compressor sludge containers, control equipment, berms, containments, and sumps	L

All Tanks	Once/Shift	Condition of tank, detect cracks, leaks, corrosion, <u>or</u> erosion which may lead to cracks or leaks, <u>or</u> wall thinning to less than specified	M
Ventilation* Structure	Once/Day	Duct work, air scrubber, damper setting	N
Alarm System	Once/Week	Audio & Visual Signals	O
Building* Structure	Once a month	Walls, ceilings, floors, structural steel	P
Silos*	Once/Week	Piping, couplings, level sensors, vent filter valves	Q
Main Control Cabinet	Once/Operating Shift	Indicator lights, readouts, indicators, recorders, monitoring system	R
Security	Once/Day	Perimeter of facility, entrances and exits, danger signs, visitors log	S
Emergency Equipment	Once/Month	Empty open head drums, shovels, T industrial absorbent, protective masks, cartridges, self contained breathing apparatus, tyvek suits, gloves, and boots, goggles, face shields, acid resistant suits, first aid equipment, shower, eyewash sinks, emergency generator	
Emergency Equipment	Once/Week	Eyewash/shower activation inspection	T-1
Emergency Equipment	Once/Year	Fire extinguishers - OSHA Standard 29 CFR 1910.157(e)(3) and NFPA Standard 10, Section 4-4, hydrostatically tested as in 29 CFR 1910.157(f) Table L-1 and/or NFPA Standard 10 Table 5-3	U
Emergency Equipment	Once/Month	Fire extinguishers and charge	U-1
All Tanks	Once/Year	Internal Inspection	(U)W-1

Storage Pad	Once/Day	Condition of containers, pads, sump, evaporation pond, perimeter	W
Crystallizer/ Evaporation Area	Once/Shift	Crystallizer, centrifuge, boiler, falling film sumps, condition of containers	X

* Inspection not mandated by hazardous waste regulations.

Tank Containments	Once/Month	Condition of containment, detect cracks, leaks, corrosion, or erosion which may lead to cracks or leaks.
Quarantined Totes	Once	Condition of totes, detect cracks leaks, corrosion, or erosion which may lead to cracks or leaks, or wall thinning to less than specified

INSPECTION PROCEDURES

INSPECTION PROCEDURE

Receiving Area and Entrance drive	All visible pipes, house couplers, valves and tanks and areas and sumps surrounding same will be visually inspected for indications of leakage and the conditions so noted in writing on inspection Log G.
Sump Level Alarms	Activation of all sump alarms once per week. Check audio and alarms systems noted on Log H.
Waste Handling Station	Same as pumping station and noted on Log I.
Chemical Storage	Same as pumping station and noted on Log J.
Waste Processing Area	Same as pumping station and noted on Log K.
Mud Handling	Same as pumping station and noted on Log L.
All Tanks	All sensor readings on main control board will be noted and visually confirmed, tank levels and conditions of tanks and recorded on Log M.

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Ventilation Systems

The scrubber and associated tanks and duct work will be inspected visually for leaks, deterioration and proper operation and noted on Log N.

Alarm System

Alarm systems will be checked per the manufacturers specifications and noted on Log O.

Building Structure

Structure will be visually inspected for leaks, cracks, corrosion, erosion or deterioration and noted on Log P.

Silos

Structures will be visually inspected for corrosion, erosion, deterioration, sensor accuracy and product delivery and noted on Log Q.

Main Control Cabinet

To be inspected per manufacturer's directions and noted on Log R.

Security

Perimeter of facility, fences, entrances and exits to be visually inspected to insure no security breach. Danger signs and visitors log to be visually inspected to insure they are in good order and all noted on Log S.

Emergency Equipment

Visual inventory and inspection to insure equipment is present, clean and in good working order and data recorded on Log T.

Emergency Equipment

Per 29 CFR 1910.157(e) and (f) and NFPA standard 10 and noted on Log U.

Emergency Equipment

Activation and inspection of eyewash shower station recorded on Log T-1.

Emergency Equipment

Fire extinguisher location and charge noted on Log U-1.

Oil Tanks

Visual inspection to be recorded on Log V.

Oil Tanks

Each tank will be drained and triple rinsed. An operator will then enter the tank through the manway provided and visually inspect the interior of the tank for cracks, leaks, corrosion or erosion which may lead to cracks or leaks, or wall thinning to less than

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the specified parameters. All findings will be noted on Log V.

Crystallizer/Evaporation Area

Crystallizer, Centrifuge, Falling Film area and equipment, piping sumps and condition of containers noted on Log X

Storage Pad Area

Condition of containers, pad, sump and evaporation pond and berm, noted on Log W.

5.40 PREVENTIVE MAINTENANCE

As stated in the introduction to this plan, its purpose is to establish an inspection routine to detect malfunctions, deterioration, leaks, and discharges. This plan shall not be used as a substitute for a routine preventative maintenance plan for facility equipment, etc., required to maintain the facility in top operational condition.

ETICAM

Fernley, Nevada

Month _____ Year _____

OPERATING RECORD

Schedule G

Receiving Area; Daily Inspection.

Remedial Action

Date	Time	Inspecting Person	Piping System	Hose Couplings	VALVE SWITCH	Base of Unloading Area Berms, Containers & Sump	Date Initialed	Action taken; Date Completed
1								
2								
3								
4								
5								
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EACH ITEM INSPECTED FOR LEAKS, DETERIORATION, PROPER OPERATION

9/2/89

SCHEDULE H

WEEKLY

9/21/89

ETICAM

OPERATING RECORD

Fernley, Nevada

Schedule I

Month _____ Year _____

WASTE HANDLING (CONCENTRATE STORAGE)

Shift I (II / III)

Shift Projection

Remedial Action

ate	Time	Inspecting Person	Tanks	Piping System	Tank Level Indicators	Pumps	Valves	Activation of Sump Level Sensors	Contain- ments	Sumps	Remedial Action	
											Date Initiated	Action Taken Completion Date
1												
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FERNLEY, NEVADA

MONTH _____ Year _____

SHIFT I (II / III)

SCHEDULE J

Chemical Storage, Shift Inspection

[illegible]

ETICAN
Fernley, Nevada

SCHEDULE K

SHIFT I (II / III)

Shift Inspection - Waste Processing

Month _____ Year _____

[illegible]

SHIFT I (II / III)

SHIFT INSPECTION

Remedial Action

[illegible]

Current Tank Storage Record

ETICAM .

Fernley, Nevada

Month _____ Year _____

Shift _____

Storage Bay

Shift Inspection

[illegible]

Shift _____ .

Shift Inspection

[illegible]

Month _____ Year _____

Schedule N

Daily Inspection - Ventilation System

Date	Time	Inspecting Person	Duct Work	Air Scrubber	Damper Setting	Outside	d1			Remedial Action	
							El.1	El.2	El.3	Date Initial	Action taken, Completion date
1											
2											
3											
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31											
		9/18/89	Items Inspected for Deterioration and Proper Operation								

Fernley, Nevada

Schedule 0

Alarm System, Weekly

Month _____ Year _____

[illegible]

Monthly Inspection-Building Structure

Month _____ Year _____

Date _____ Time _____ Inspecting Person _____

Items Inspected *	Areas Inspected	Receiving Bay	Storage Area	Dewatering Room	Detoxification Room	Metal Recovery Room
Walls						
Ceilings						
Floors						
Structural Steel						
Remedial Action	Date Initiated					
	Area					
	Action Taken					
	Completion Date					

* Items inspected for deterioration

OPERATING RECORD

ETICAM

Schedule Q

Fernley, Nevada

Silos; Weekly Inspection

Year _____

Remedial Action

Week#	Time	Inspecting Person	Piping	Couplings	Level Sensors	Vent Filter Valves	Date Initial	Action Taken Completion Date
1								
2								
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9/18/89

Shift Inspection

[illegible]

ETICAM

Schedule S

Daily Inspection - Security

[illegible]

ETICAM

Fernley, Nevada

OPERATING RECORD

Schedule T

Emergency Equipment, Monthly

Month _____ Year _____

Remedial Action

Date	Check For	Okay	Unacceptable	Date Initiated	Action Taken, Completion Date
Empty Open Head Drums	Adequate quantity In place				
Industrial Absorbent	Adequate quantity In place				
Protective Masks	In place Operational				
Air Cridges	In stock				
Emergency Containing Breathing Apparatus	In place Operational				
Leak Suit	Adequate quantity In place				
Gloves	Adequate quantity In place				
Boots	Adequate quantity In place				
Eye Goggles	In place Clean				
Face Shields	In place Clean				
Acid Resistant Suits	In place Good condition				
First Aid Equipment	In place Full stock				
Showers	In place Operational				
Eye Wash Sinks	In place Operational				
Emergency Generator					
Shovels					

9/18/89

INSPECTION SCHEDULE T-1

EYEWASH & FIRE EXTINGUISHER INSPECTION

MONTH: _____ WEEK # _____ OPERATOR _____

FIRE EXT.	CONDITION	COMMENTS	EYE WASH STATION	CONDITION	COMMENTS
1			Truck Bay		
2			East Side		
3					
4			Truck Bay		
5			West Side		
6					
7			Storage Bay		
8			North End		
9					
10			Storage Bay		
11			Middle		
12					
13			Storage Bay		
14			South End		
15					
16			Detox		
17					
18			Dewatering		
19					
20			Mefax By		
21			Panel		
22					
23			Mefax By		
24			Compressor		
25					
26			Dry Lab		
27					
28			Assay Lab		
29					
30					
31					
32					

YEAR 1951

Monthly Fire Extinguisher Charge Log

[illegible]

Fernley, Nevada

Schedule U

Monthly Fire Extinguisher Charge Log

YEAR _____

[illegible]

FIRE

EXTINGUISHED

RECEIVING BAY

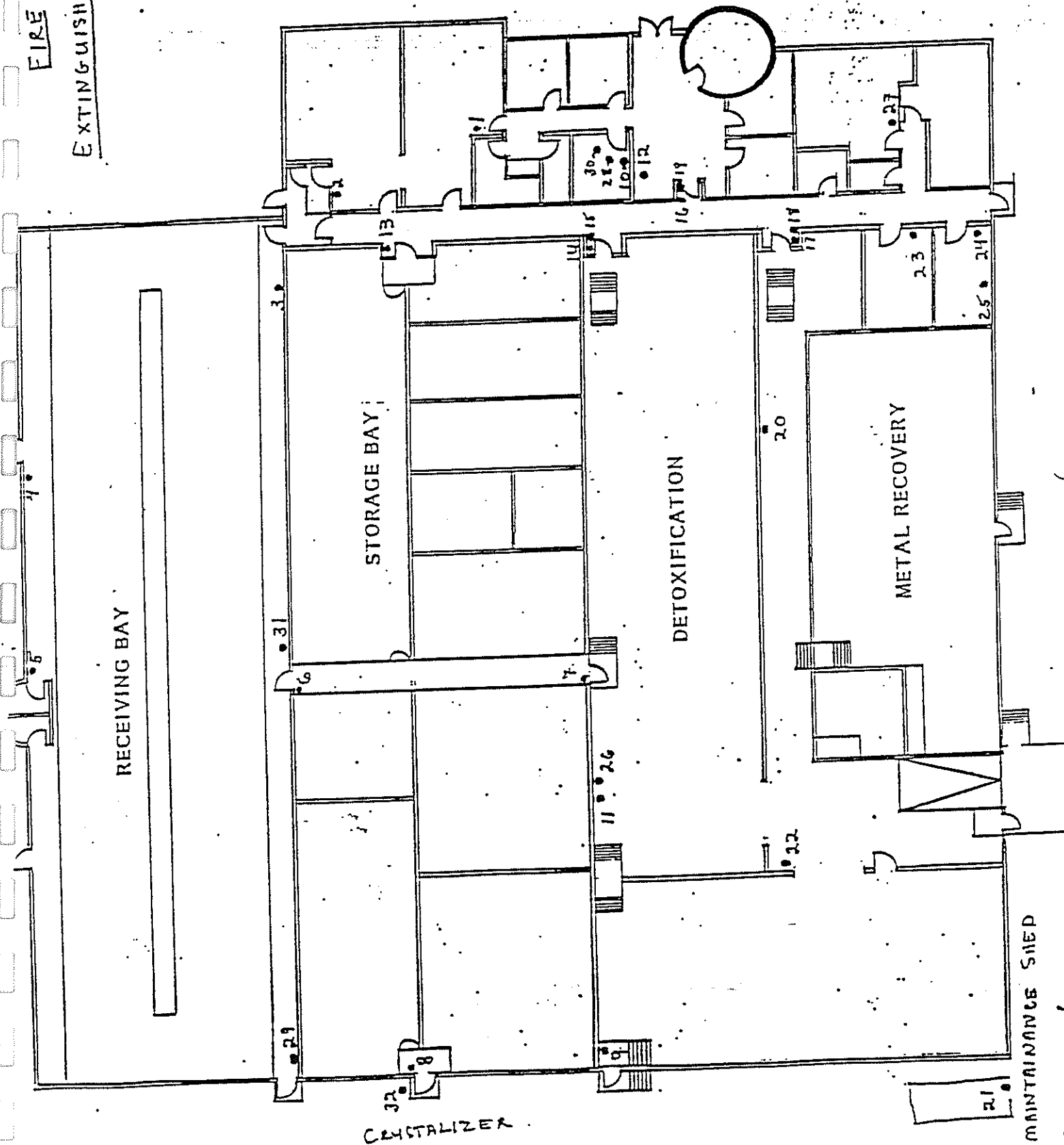
STORAGE BAY

DETOXIFICATION

METAL RECOVERY

MAINTENANCE SHED

CRYSTALLIZER



Schedule W, page 1

Fernley, Nevada

Month _____ Year _____

Shift _____

[illegible]

ETICAM

Schedule W-1

Fernley, Nevada

Tank Inspecting Log

Annual Inspection

Date _____

[illegible]

ETICAM
Fernley, Nevada

OPERATING RECORD

Schedule X

Month _____ Year _____

CRYSTALLIZER EVAPORATION AREA

SHIFT INSPECTION

Remedial Action

Date	Time	Inspecting Person	Piping System	Crystallizer/ Centrifuge	Boiler	Falling Film	Sump Level	Area	Remedial Action	
									Date Initialed	Action taken; Date Completed
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8/21/89

EACH ITEM INSPECTED FOR LEAKS, DIERIORATION, PROPER OPERATION

10.00

PERSONNEL TRAINING

ETICAM
Fernley, Nevada

0.00 INTRODUCTION

10.11 PURPOSE

Training, in accordance with this section, is necessary to ensure that facility personnel are instructed to perform their duties in a way that ensures proper and safe operation in compliance with applicable State and Federal hazardous waste regulations. At a minimum, the training program is designed to ensure that facility personnel are able to respond effectively to emergencies. In addition, the training program, as written is intended to provide all personnel with sufficient on the job training and classroom instruction so that the facility properly conducts and documents proper management of the hazardous waste generated.

10.12 GENERAL REVIEW OF TRAINING PROGRAM

10.12 ORGANIZATION

The type and level of instruction and/or of on the job training shall be that which is required of each employee within their job classification. The specific areas of training to be provided to employees within the various job classifications is indicated in Section 10.30. Employees within these job categories are listed in Section 10.20. Job descriptions are also provided in Section 10.20. Section 10.40 details the topics to be covered under the "training modules", subject areas of training, assigned to the job categories in Section 10.30. As can be seen by a review of the training module list and assignment of modules to the job categor-

ies, employees shall receive familiarity with what is required to properly and safely manage and operate the facility.

10.12.2 TRAINER(S) QUALIFICATIONS-REQUIRED

Training shall be directed (only) by a person knowledgeable in hazardous waste management procedures. (Initial) Training of facility personnel will be conducted by the facility's training staff or consultants in hazardous waste management. The various training modules are indicated in Section 10.30. The qualifications of the instructors are indicated in Section 10.50.

10.12.3 NEW EMPLOYEES/REASSIGNMENT

New employees and those employees who are reassigned to another position, will be trained within six months after the date of their employment or reassignment. Employees will not work in an unsupervised position until they have completed the training requirements specific to their position.

10.12.4 ANNUAL REVIEW

All facility personnel will take part in an annual review of the initial training. Said training will be documented and modified when found to be inadequate. Records of the annual review shall specify the contents of each meeting including, but not limited to, such topics as:

Changes in emergency coordinators and general operations;

Any event requiring the implementation of the contingency plan, notification requirements, etc.

10.20 FACILITY PERSONNEL JOB TITLES AND DESCRIPTIONS

10.21 TITLES AND PERSONNEL LIST

The following is a listing of job titles for each position at the facility related to hazardous waste management, and the name of the employee filling the position:

NAMES(S) OF PERSONNEL IN JOB POSITION	
JOB TITLE	NAMES OF PERSONNEL IN JOB POSITION
1. (Technical Director) Facility Manager	
2. (Environmental Manager) Regulatory Coordinator	
3. (Plant Manager) Production Manager	
4. Plant Operators	
5. Laboratory Personnel	
6. Maintenance	
7. Sales	
8. Administration	

10.22 DESCRIPTION OF JOB POSITIONS

The following is a description of the job titles listed in Section 10.21. The description includes the requisite skill, education, or other qualifications and duties of employees assigned to each position.

1). Position: (Technical Director) **Facility Manager**

Position Duties:

Maintains knowledge of all applicable State/Federal hazardous waste regulations and all aspects of facility operation in accordance with regulatory requirements; assists in training of personnel in the proper performance of jobs related to hazardous waste activities; acts as primary emergency coordinator; responsible for overseeing the hazardous waste management program at the plant.

Position Qualifications:

B.S. Degree in Engineering or Chemistry or equivalent, and at least 10 years experience in technical position and 5 years experience in technical management position. Demonstrated knowledge of EPA and DOT regulations through self education, on the job experience and through attendance at seminars on the subject; knowledge of all aspects of facility operation and knowledge and authority to direct emergency procedures.

2). Position: (Environmental Manager) Regulatory Coordinator

Position Duties:

Maintains knowledge of all applicable State/Federal hazardous waste regulations. Responsible for ensuring compliance with applicable regulations. Oversees operation of the facility. Hazardous waste related duties include: regular inspection of waste storage and treatment areas, review of manifests, waste analysis procedures, overseeing labeling, reviewing regulatory status of facilities and transporters. Acts as alternate emergency coordinator. Maintains compliance with all applicable environmental permits.

Position Qualifications:

B.S. Degree in Engineering or chemistry or equivalent knowledge of EPA and DOT regulations through self education, on the job experience, and attendance at seminars on the subject; knowledge of all aspects of facility operations and knowledge and authority to direct emergency procedures.

3). Position: (Plant) Production Manager

Position Duties:

Maintains knowledge of all applicable State/Federal hazardous waste regulations and all aspects of facility operations in accordance with the permit requirements; participates in the training of plant personnel under his supervision.

Position Qualifications:

B.S. Degree in Engineering and/or 5 years experience in a technical or management position. Knowledge of EPA and DOT regulations through self education, on the job experience, and through attendance at seminars on the subject; knowledge of all aspects of facility operation and knowledge and authority to direct emergency procedures.

4). Position: Plant Operators and Laboratory Technicians

5).

Position Duties:

Maintain knowledge of applicable State/Federal hazardous waste regulations as they apply to their specific job functions.

Position Qualifications:

Knowledge of proper plant operations and characteristics of materials processed. Knowledge of EPA regulations as they pertain to specific job functions. Familiar with emergency procedures and clean up operations. Lab technicians to have B.S. or A.S. Degree in Chemistry.

10.30 DESIGNATION OF TRAINING MODULES SPECIFIC TO JOB TITLES (CATEGORIES)

The following is a list of the training modules, subject area, to be conducted for each of the job positions listed. After the initial training period, training of plant personnel is to be conducted by the Environmental Manager. Plant personnel will be trained on the job or in classroom sessions.

JOB TITLES

TRAINING MODULES TO BE CONDUCTED

1). Technical Director	All modules
2). Environmental Manager	All modules
3). Plant Manager	All modules
4). Plant Operators	All modules
5). Lab Technicians	All modules

10.40 TRAINING MODULE CONTENTS OUTLINED

A. WASTE IDENTIFICATION:

- 1- HAZARDOUS WASTE IDENTIFICATION SYSTEM
- 2- USEPA HAZARDOUS WASTE IDENTIFICATION SYSTEM
- 3- SAMPLING AND ANALYSIS PROCEDURES

B. SHIPMENT OF HAZARDOUS WASTE:

- 1-USDOT/USEPA SHIPPING REQUIREMENTS
 - Manifests
 - Labeling Drums
 - Marking Drums
 - Placarding Trucks
(Specifically USDOT regulations
49 CFR Parts 171, 172 part 173.)
 - Packaging

C. WASTE HANDLING AND TREATMENT:

- 1- WASTE HAZARDS ASSOCIATED WITH HANDLING
(Properties of Wastes)
- 2- SAFETY PRECAUTIONS - SAFETY EQUIPMENT
- 3- SPILL CONTAINMENT AND CLEAN UP
- 4- WASTE ACCEPTANCE PROCEDURES - SAMPLING/TESTING
- 5- WASTE PROCESSING PROCEDURES

D. WASTE STORAGE

- 1- PROPER STORAGE OF HAZARDOUS WASTE
 - spill detection and clean up
 - labeling and marking

E. RECORD KEEPING

- 1- INSPECTION RECORDS
- 2- MANIFEST RECORDS
- 3- TRAINING RECORDS
- 4- WASTE ANALYSIS RECORDS

F. INSPECTION REQUIREMENTS

1- FACILITY INSPECTION PLAN

G. EMERGENCY PROCEDURES

- 1- CONTENTS AND INTENT OF CONTINGENCY PLAN
- 2- IMPLEMENTATION
- 3- NOTIFICATION PROCEDURES
- 4- SPILL CONTAINMENT AND CLEAN UP
- 5- EVACUATION PROCEDURES
- 6- COMMUNICATIONS
- 7- ARRANGEMENTS WITH AUTHORITIES REVIEWED
- 8- REVIEW OF EMERGENCY COORDINATOR'S ROLE

H. EMERGENCY EQUIPMENT

- 1- REQUIRED PER REGULATION
- 2- AVAILABLE AT ETICAM
- 3- LOCATIONS AT ETICAM
- 4- USE OF
- 5- INSPECTION OF
- 6- REPLACEMENT/REPAIR

I. EMERGENCY COORDINATOR DUTIES

- 1- ROLE/AUTHORITY/KNOWLEDGE (REQUIRED)
- 2- RESPONSIBILITIES
- 3- AVAILABILITY
- 4- REVIEW OF ALL ASPECTS OF CONTINGENCY PLAN

J. TRAINING PROGRAM

- 1- INTENT
- 2- CONTENT
- 3- REQUIRED RECORDS AND ANNUAL REVIEW

It is estimated that all modules will take from one to four hours to conduct. Training will be provided at least once each year, or more frequently as deemed necessary by management. Initially training will be conducted in conference type sessions followed by on the job training by supervisory personnel.

10.50 INDIVIDUALS QUALIFIED TO TRAIN

The initial classroom training will be carried out by a qualified individual or consulting firm. The (Environmental Manager)

Regulatory Coordinator (will carry out) **over sees** classroom and on the job training of new personnel and will conduct annual reviews of training. He will maintain his knowledge of regulations and procedures through self study, on the job experience and by attending seminars on the subject. From time to time the (Environmental Manager) **Regulatory Coordinator** may rely on selected individuals as their expertise is required to train facility personnel.

10.60 TRAINING RECORDS

The Environmental Manager will maintain documents and records at ETICAM which include the following information:

- Job title for each position at the facility related to hazardous waste management, and the name of the employee filling each job..

- A written job description.

- A written description of the type and amount of both introductory and continuing training given.

- Records documenting training.

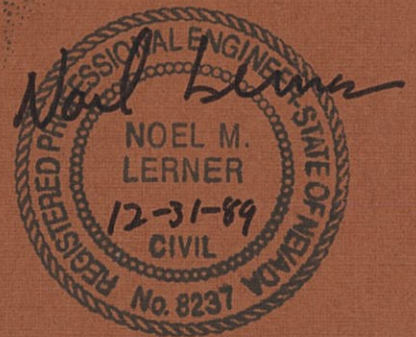
- An annual review of the initial training is held.

- Training records are maintained and kept until closure of the facility.

DESIGN REPORT

MAJOR EXPANSION

ETICAM
FERNLEY, NEVADA



K/J/C 897032.01
September 1989

Kennedy/Jenks/Chilton

KENNEDY/JENKS/CHILTON

**ETICAM
CHAPTER 1**

INTRODUCTION

K/J/C 897032.00

CHAPTER 1

INTRODUCTION

The purpose of this report is to give a brief description of plant modifications which ETICAM Corporation is planning for their Fernley facility which are subject to their Part B permitting process. The objectives for this expansion are threefold:

1. A desire by ETICAM Corporation to improve the overall efficiency of the existing facility.
2. An anticipation of customer needs in terms of treatment methods for sludge waste streams in addition to the liquid waste streams currently being received.
3. A demand by current customers for an increased liquid waste treatment processing capacity of more complex streams at the existing facility.

This report shall describe those improvements necessary to realize ETICAM Corporation's goals for ultimate expansion of the facility. A narrative is also included in this report and will provide a more detailed description of the process methodologies that will be utilized within the facility. In addition, site and building layout drawings are included in order to show the proposed locations for improvements and their specific uses. Equipment catalogue cuts are also presented herein.

BACKGROUND

The ETICAM facility treats liquid metallic wastes from various industries; including electroplating, metal finishing, electronics and aeronautics. The ETICAM facility is located in Lyon County, within the jurisdictional limits of the town of Fernley.

The facility is located on a 10.5 acre level site. See Sheet A. There are two entrances to the site and the entire site is fenced to prevent unauthorized entry.

CURRENT CAPABILITIES

The liquid waste streams currently being received by ETICAM are transported to the facility from generators via tanker trucks range from 80,000 to 200,000 gallons per month. Once at the facility, the liquid waste is classified according to its metal composition and is transferred to storage tanks prior to processing. The liquid is then pumped to one of three treatment basins, each with a capacity of 7292 gallons. All piping and storage vessels are provided with secondary containment.

Metals are precipitated out of solution and the resulting sludge is pumped through one of two existing filter presses where it is dewatered and a filter cake is produced. This filter cake is processed through one of three dryers, each with a capacity of three cubic feet per hour. The end product of the

process is shipped to smelters for reclamation.

The treated effluent is then evaporated in an evaporator crystallizer system which separates dissolved salts. These salts are a waste by-product.

MAJOR EXPANSION

The major expansion includes improvements to both the liquid waste treatment capabilities, and the addition of sludge receiving and processing equipment. See Sheet B.

Additional alkaline, acid and cyanide waste storage tanks will also be included in the expansion. Currently, the existing tank farm has several open locations within the containment area in which tanks may be placed in order to increase storage volume (see Sheet D). New liquid waste storage tanks will be placed in these "open locations".

The major expansion of the facility will include the addition of five new treatment vessels for liquid waste processing. In addition, new filter presses will be required to meet the increased throughput generated by the added treatment vessels.

A bulk sludge receiving area consisting of new sludge hoppers and associated conveyance features will be constructed. The sludge will then be conveyed to new dryers to begin processing. Two of the three existing three cubic foot per hour dryers currently in use will be relocated and will be used to dry sludge generated by the liquid processing section of the facility. The third will be stored and used for standby.

A new multi-stage flash evaporator and a crystallizer will be installed to

meet the increased evaporative requirements resulting from the addition of the new treatment system. In addition, a new air scrubber and baghouse will be placed into operation to service the new facilities. These units will be used to control particulate and off-gas emissions that may be generated by the chemical and heat reactions involved in the recycling process.

Site paving and grading improvements will be included in the facility expansion plan as well. Turn-around areas for truck traffic and minor storage areas for roll-off containers will be added as shown on the included site plan. A covered container storage area will be located in the northwest corner of the site. This will provide temporary storage of sludge wastes in a zero-discharge containment area. Other additional improvements will be covered in the narrative section of this report.

KENNEDY/JENKS/CHILTON

**ETICAM
CHAPTER 2**

NARRATIVE

K/J/C 897032.00

CHAPTER 2

NARRATIVE

BACKGROUND INFORMATION

Expansion to the ETICAM Corporation's facility will occur in two specific process areas: liquid waste and bulk sludge waste. The original facility was permitted for treatment of liquid and sludge waste streams. The expansion will involve additional liquid storage and treatment tanks, and bulk sludge receiving tanks. There will also be moderate ancillary improvements to the facility that will be required in conjunction with the resulting increase in waste processing capacity. The following narrative will describe those facilities and processes which are currently in existence at the site, as well as those improvements which will be made in the expansion of the facility.

EXISTING FACILITIES

Liquid Waste Receiving

Incoming waste solutions are off-loaded in a receiving bay located on the west side of the facility. See Sheets A, C and D. The bay is divided into three distinct sections which are separated by a berm in order to segregate and therefore avoid cross contamination of incompatible solutions. The floor is sloped so as to contain any wash water or accidental spills within a protected area. Acid and alkaline solutions are off-loaded in the west bay and the north end of the east receiving bay. The south end of the east receiving bay is used exclusively for cyanide solutions.

Upon unloading, the solutions are further segregated depending upon their metal composition, concentration, pH and cyanide content. This separation is to ensure a high concentration of each metal in the sludge which is resultant from the processing of the solutions. Each storage area is provided with secondary containment as required by Federal regulations.

From the receiving bay, the solutions are then transferred by gravity to an incoming waste storage area to await processing (see Sheets C and D).

Treatment Chemical Receiving

Treatment chemicals for use in the processing of the waste solutions are also off-loaded in the receiving bay. Hose connections are provided for the following compounds:

- o Sodium Hydroxide
- o Sodium Hypochlorite
- o Miscellaneous Reagents
- o Hydrochloric Acid
- o Ferric Chloride
- o Sulfuric Acid

The incoming treatment chemicals are transferred by gravity to chemical storage tanks which are separated, according to compatibility, into a secondary containment area. From the chemical storage tanks, the chemicals are transferred to dosing tanks within the plant.

Liquid Waste Processing

Waste solutions are pumped from the storage area to the liquid processing area for treatment. Metals are then removed from the solutions by precipitation as insoluble sulfides and hydroxides. The tanks are agitated during the chemical addition process by mechanical mixers. Three 7292 gallon covered processing tanks are currently in use: Two for treatment of acid or alkaline waste and one for cyanide containing wastes. Vapors produced during processing of the liquid wastes are vented through ducts to a wet scrubber.

Sludge Handling

After processing, the treated wastewater and resultant precipitate are transferred to sludge holding tanks prior to filtration. Two sludge holding tanks are currently in use at the facility, each with a volume of 7159 gallons.

Filtration and Filter Cake Drying

The sludge is then pumped to filter presses for dewatering. The existing system consists of two filter presses with an individual sludge cake capacity of about 10 cubic feet. Sludge cake from the presses is currently collected in containers for transfer to the dryers. The three dryers that are in use at the present time each have a drying capacity of one cubic foot per hour. The dried material is then collected in drums to await shipment.

Ion-Exchange and Evaporation

Filtrate from the filter presses is transferred to a pH adjustment tank where acid or caustic is added as required to neutralize the solution prior to passing it through ion exchange tanks. The system is designed to then pass the water through an anionic and a cationic exchange column to remove anions and cations prior to evaporation. The water passes through the columns into effluent holding tanks, then to the evaporation system. Approximately 50 percent of the water is driven off in a falling film evaporator. The remainder of the solution is transferred to a forced circulation crystallizer, where the water content is further reduced. The resultant residue salt produced by the crystallizer is removed with a centrifuge. The residual salt crystals are collected in drums and stored while the concentrate is returned back to the crystallizer.

Condensate from the falling film evaporator is collected in condensate collection tanks, used as plant make-up water, or discharged to the sewer along with the plant effluent.

NEW FACILITIES

Liquid Waste Storage

An increase in the liquid waste storage capacity of the facility is planned to correspond with the increased treatment capabilities. A breakdown of the new tank installations as well as their locations and capacities are given below:

NEW LIQUID STORAGE TANKS

<u>WASTE STORAGE AREA</u>	<u>NO. OF TANKS</u>	<u>TOTAL CAPACITY</u>
Cyanide or alkaline	7	24,500 gallons
Acid	9	31,500 gallons
Cyanide	4	28,000 gallons
Alkaline	2	14,000 gallons
Option Tank	1	7,000 gallons
Waste/Reagent	1	5,613 gallons

Liquid Waste Processing

Six additional treatment tanks will be added to the liquid waste processing area (see Sheets D and E). Tanks T-7, T-8 and T-9 may be used to treat alkaline or cyanide wastes. Tanks T-4, T-5, and T-6 may be used to treat acid or alkaline wastes. The combined capacity of the new treatment tanks will be approximately 31,500 gallons. The following table reflects the expected volume of each new reactor.

NEW TANKS

<u>NUMBER</u>	<u>VOLUME</u>	<u>USE</u>
TANK T-5	3,500 gallons	Acid or Alkaline
TANK T-6	7,000 gallons	Acid or Alkaline
TANK T-7	7,000 gallons	Alkaline or Cyanide
TANK T-8	7,000 gallons	Alkaline or Cyanide
TANK T-9	7,000 gallons	Alkaline or Cyanide
TANK C-3	6,000 gallons	Sludge Holding Tank
TANK C-4	6,000 gallons	Sludge Holding Tank
TANK C-5	7,000 gallons	Partially Treated Waste Tank
TANK C-6	7,000 gallons	Partially Treated Waste Tank
TANK N-1	2,853 gallons	Neutralization Basin
TANK N-2	2,853 gallons	Neutralization Basin
TANK D-1	2,960 gallons	Dissolution Tank
TANK D-2	2,960 gallons	Dissolution Tank
TANK D-3	2,960 gallons	Dissolution Tank
TANK H-1 thru H-5	5,000 gallons each	Sludge Hopper

New dosing tanks will also be installed to service the new reactors. A new wet scrubber system will be added in the treatment area to remove vapor emissions caused by the new treatment tanks. Cyanide piping will be double walled where it crosses non-alkaline areas.

SLUDGE HANDLING

Sludge Storage

Sludge handling equipment will be relocated into one common area which is currently the metal recovery room (MEFAX). Two existing sludge holding tanks, C-1 and C-2, will be relocated and possibly replaced with cone bottom tanks at a later date. The relocations for Tanks C-1 and C-2 are shown on Sheets D and E. Two new cone bottom tanks, C-3 and C-4, with individual capacities of 7000 gallons will be installed as shown on Sheets D and E. Transfer pumps and ancillary piping will transfer the sludge to the filter presses.

Liquid Filtration and Filter Cake Processing

New filter presses will be installed along with relocating the two existing presses. These new presses will replace the 2 meter belt filter press originally installed. The addition of the new presses will more than double the present filtration capacity of the facility thereby minimizing storage needs. The sludge cake will be transferred to the bulk sludge drying room for processing while filtrate from the filtration process shall be sent to the evaporation system. The filtrate may require intermediate pH neutralization before evaporation.

Intreatment/Effluent Storage

C-5 and C-6, each containing 7,000 gallons, will be used for one of three purposes to meet plant operation constraints:

1. Treated water.
2. Partially treated waste pH5 to pH10.
3. Treated slurry prior to filtration.

FILTRATE EVAPORATION

The filtrate evaporation capabilities of the system will be enhanced by the addition of a second evaporator and a multi-stage, flash evaporator.

BULK SLUDGE RECEIVING

Receiving

The future bulk sludge receiving area shall consist of five hoppers with a total capacity of 200 cubic yards. Hoppers H-1 and H-2 will be originally constructed to hold up to 5000 gallons of sludge with provisions to increase capacity to 8000 gallons at a later date. Each hopper will be designed to account for the variability in the angle of repose of the various sludges. Three of the hoppers will be designed to accept sludge from bulk containers which will be off-loaded from a truck bed or a boom lift attached to a flat-bed trailer. Two hoppers (H-1 and H-3) will be designed to accept both bulk sludge containers and small containers which will be off-loaded onto a loading dock adjacent to the sludge hopper. Small containers will be dumped into the hopper via a lift designed specifically for emptying drums or bins containing sludge. Each hopper will be equipped with a folding lid that will close over the hopper once the sludge has been deposited. This cover will provide dust control. Three dissolution tanks with a capacity of 2960 gallons will also be placed in this area as shown on Sheets D and E. These tanks will enable

liquid phase treatment of reactive sludges such as cyanide bearing or sulfide bearing sludges.

Both the upper and lower levels of the receiving area will include sumps designed to contain liquids which may result from sludge transporting as well as any wash down water which may be used. The floors will be sloped so that any spilled waste will be contained within the handling area.

Sludge receiving and processing areas will be segregated by secondary containment to avoid mixing non-compatible sludges.

The area will be provided with a baghouse and air scrubber combination to control particulate and vapor emissions. The area will also be protected by a fire protection system consisting of overhead sprinklers.

Bulk Sludge Drying

Sludges will either require no chemical treatment when received or will be treated in a solid or liquid phase prior to drying. Sludge mixing and blending is required in most cases to meet smelter specifications. Blending serves two basic needs:

1. Provides a larger quantity of uniform material; a furnace operator can then more efficiently process the sludge.
2. Unwanted contaminants such as chlorides and phosphates can be reduced to acceptable levels when blended into a larger sludge mass.

Sludge will be transported from the receiving areas to the drying area via conveyors. A cross conveyor will be installed so that sludges of different composition or concentration can be blended. Each receiving hopper will then feed sludge directly to dryers with a minimum combined total drying capacity of ten cubic yards per hour. Two of the existing dryers will be relocated to this new drying area (see Sheets D and E) and can be used to dry specific small volume sludges generated by the liquid processing section of the facility. The third dryer will manually be used for back up. A baghouse will be utilized in this area to control particulate emissions resulting from the drying process.

Sludge Pelletizing/Aggregate Production

The dried sludge material may be fed to pelletizing/aggregate production equipment in order to process the material into a more manageable form or to minimize dust formation. Dried sludge produced by the relocated dryers will be fed through the pelletizers on an "as available" basis.

The pelletized product will then be emptied into bag hoppers that will be utilized to both package the dried material as well as provide intermediate storage. A small storage area and a loading dock, located at the rear of the drying area, are shown on Sheets D and E. This area will be used for packaged material storage and loading of the material onto trucks for shipment to smelters.

The pelletizing/aggregate process will utilize chemical addition to stabilize some sludges and make an end product suitable for use as an aggregate or meet land fill requirements. The final step in the aggregate process utilizes a furnace to complete a proprietary ceramic formation.

ANCILLARY IMPROVEMENTS

In addition to those improvements which have previously been described, some other minor improvements will also be constructed as part of the facility expansion.

Compressors - One additional air compressor will be installed in a relocated compressor room as shown on Sheet D. This will be necessary to meet the additional compressed air requirements brought on by the additional filter presses.

Electrowinning - An electrowinning process area will be expanded as shown on Sheet D. This will be used in the processing of high strength liquid and sludge cyanide wastes. Note that the existing electrolytic cells were considered reclamation processes and not included in the permit.

Peroxide and Ozone - A storage area for peroxide and ozone is shown on Sheet D. Both may be used to oxidize specific wastes.

Carbon Columns - Two carbon columns will be added to treat specific wastes. See Sheet D.

Sumps - All sumps will be lined with a chemical resistant liner and shall have a "level" alarm to indicate to operators when they contain liquids.

Dump Tanks - Four new polypropylene dump tanks will be installed to temporarily store crystallizer brine solution to segregate waste streams in emergency situations.

Centrate Tanks - Four new mild steel centrate tanks will be installed to store liquids awaiting centrifuge processing.

Site Improvements - Paving and grading improvements will be made to the existing site as is shown on Sheet A. These improvements will be required due to the expansion of the buildings, as well as to accommodate the resultant increase in truck and transport traffic caused by the new sludge receiving area. All improvements to the site will comply with all current or modified permits and regulations that exist for the site. Some minor utility relocations may be required and these relocations will also be in compliance with all applicable permits.

Container Storage

The container storage area, as shown on Sheet A, will provide covered storage for approximately 29 roll-off containers with individual capacities of 20 cubic yards. A sludge mixing hopper (20 cubic yards) (see Sheet A) will be located in this area to allow a blending of incoming sludges before they are processed. Sumps will be used to contain any errant waste that may spill from the containers while they are stored. These sumps, with zero discharge

containment, will be located throughout the pad. The area will be bermed and an impervious liner will also be placed underneath the pad in order to prevent the possibility of waste seepage into the underlying soil. This area will also be used to store smaller containers, and the maximum amount stored will be 600 cubic yards.

Rail Service

A railroad spur, as shown on Sheet A , will be constructed during this expansion. This spur will be used to receive both sludge and liquid waste streams which may be transported to the facility via railway. Spill containment facilities will be incorporated in the design of the spur. Both incoming and outgoing waste liquids and sludges will be handled by rail.

Safety and Health Considerations:

1. All new concrete floor surfaces will be coated with chemical and traffic resistant coatings.
2. The bulk storage feed hoppers will have low rise sides that extend from the finished floor elevation to approximately 2.5 feet above the floor elevation. The feed hoppers will also have safety railing around their perimeter, as well as folding lids, to prevent workers from exposure to wastes or accidentally slipping into the hopper.
3. All processing areas will be "outfitted" with sumps and level indicators to intercept spillage of wastes and rinse water. All new tank storage areas will have secondary containment to meet all applicable federal regulations. The containment will consist of concrete berm walls creating an enclosed perimeter which will have a volume equal to 110% of the volume of the largest tank in the containment area.
4. All new process areas will be equipped with fire sprinkler networks and associated appurtenances.
5. New waste processing area will include hose bibs to be used for rinse and wash water.
6. Electrical outlets will be installed throughout the new bulk storage receiving and drying facility to enable the use of small maintenance equipment as required in the addition.

KENNEDY/JENKS/CHILTON

**ETICAM
CHAPTER 3**

ILLUSTRATIONS

K/J/C 897032.00

KENNEDY/JENKS/CHILTON

**ETICAM
CHAPTER 4**

CATALOGUE CUTS

K/J/C 897032.00

SLUDGE FEED MECHANISMS

STEELE 88C

even feeders for:

Attapulgite, Bauxite, Bentonite, Calcium Hypochlorite, Coal Fines, Diatomaceous Earth, Filter Cakes, Fly Ash, Iron Oxide, Montmorillonite, Mullite, Sand, Sawdust, Sludges, Thixotropic Materials, and many other substances, wet or dry.

The 88C Even Feeder will feed at a consistent rate, by volume, within a range of 3%. It feeds a wide variety of materials ranging in moisture content from very dry almost to the slump stage, and it does it without bridging over.

Although the three basic models are the 2-shaft 44C, the 4-shaft 88C (the standard) and the 8-shaft Double 88C, constant and variable speed drives, changes in design configurations and available options provide almost unlimited adaptability to conditions existing.

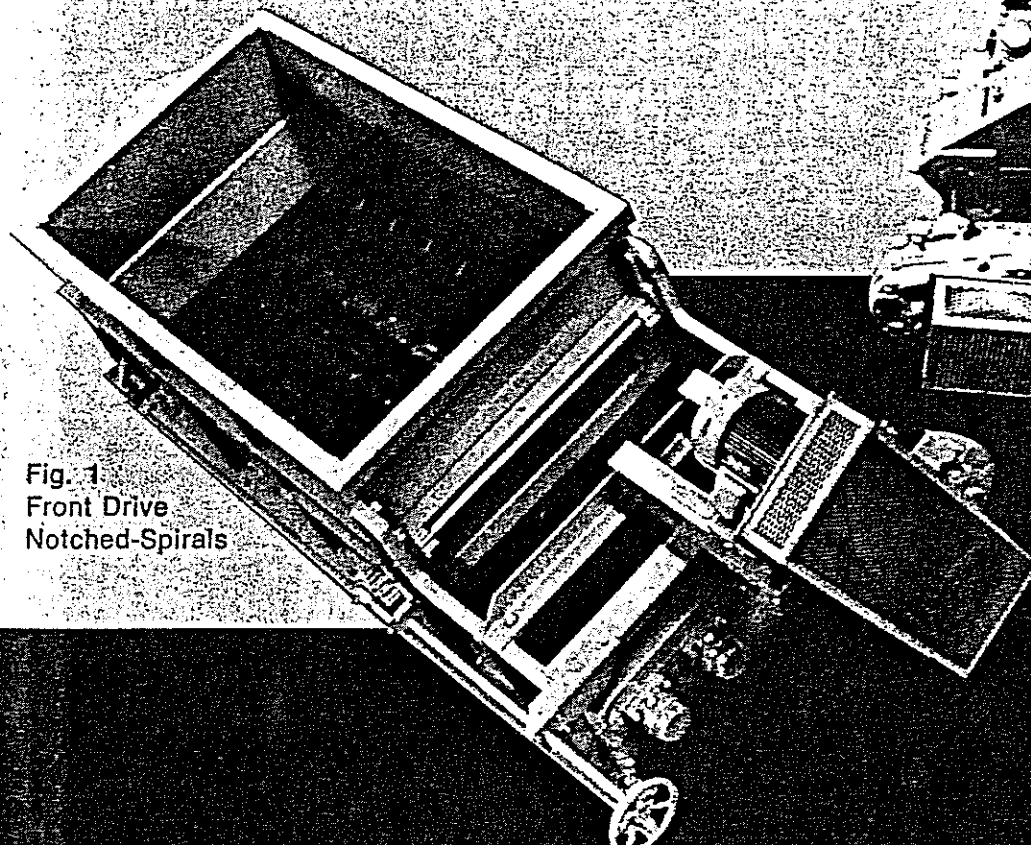


Fig. 1
Front Drive
Notched-Spirals

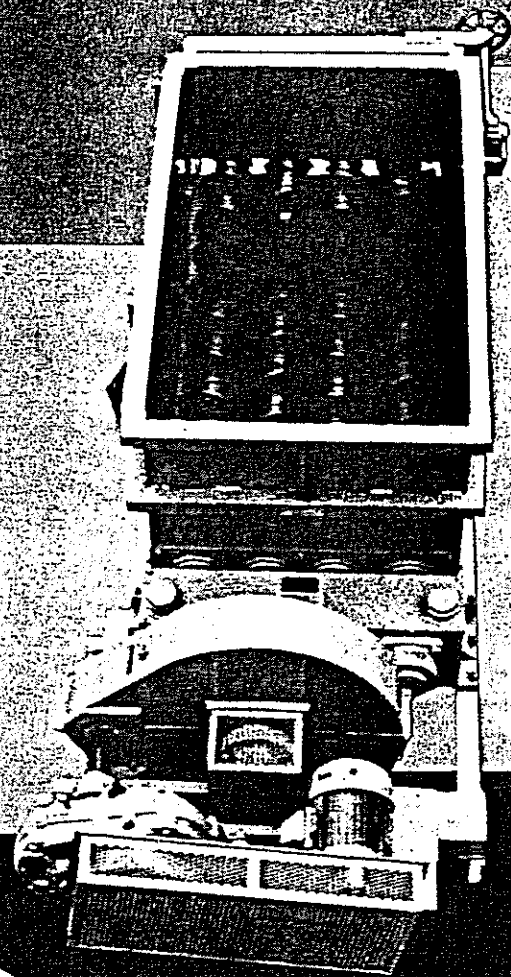
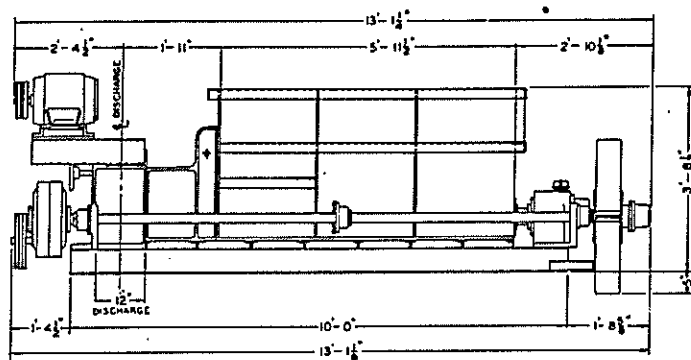


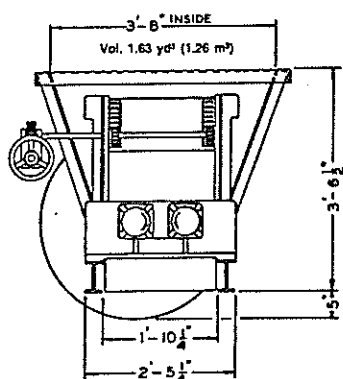
Fig. 2
Rear Drive
Full-Spirals



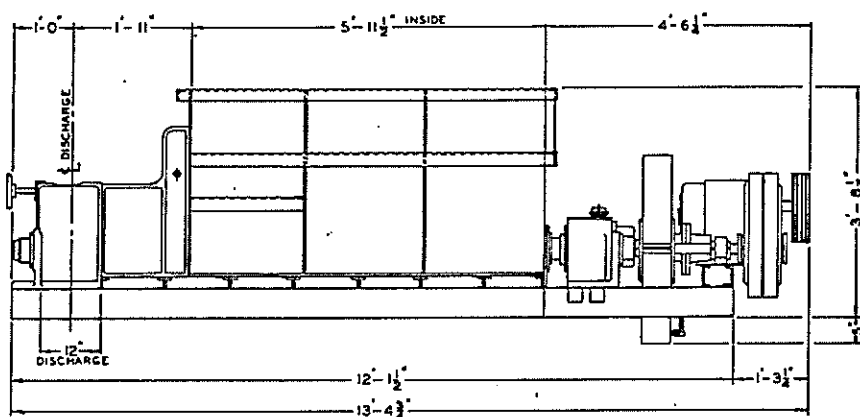
FRONT DRIVE

Fig. 14

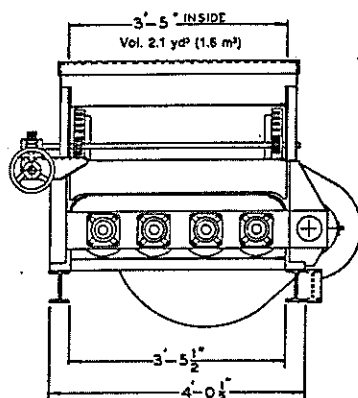
(Side views apply to Nos. 88C and Double 88C Feeders. 44C Feeder available only with Front Drive.)



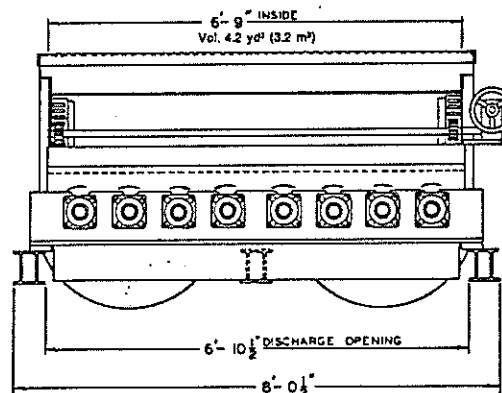
44C
Weight: 5500 lbs.



REAR DRIVE



88C
Weight: 8500 lbs.



Double 88C
Weight: 15000 lbs.

PRINTED IN U.S.A. — EJP/5/83/6M

J. C. STEELE & SONS, INC.

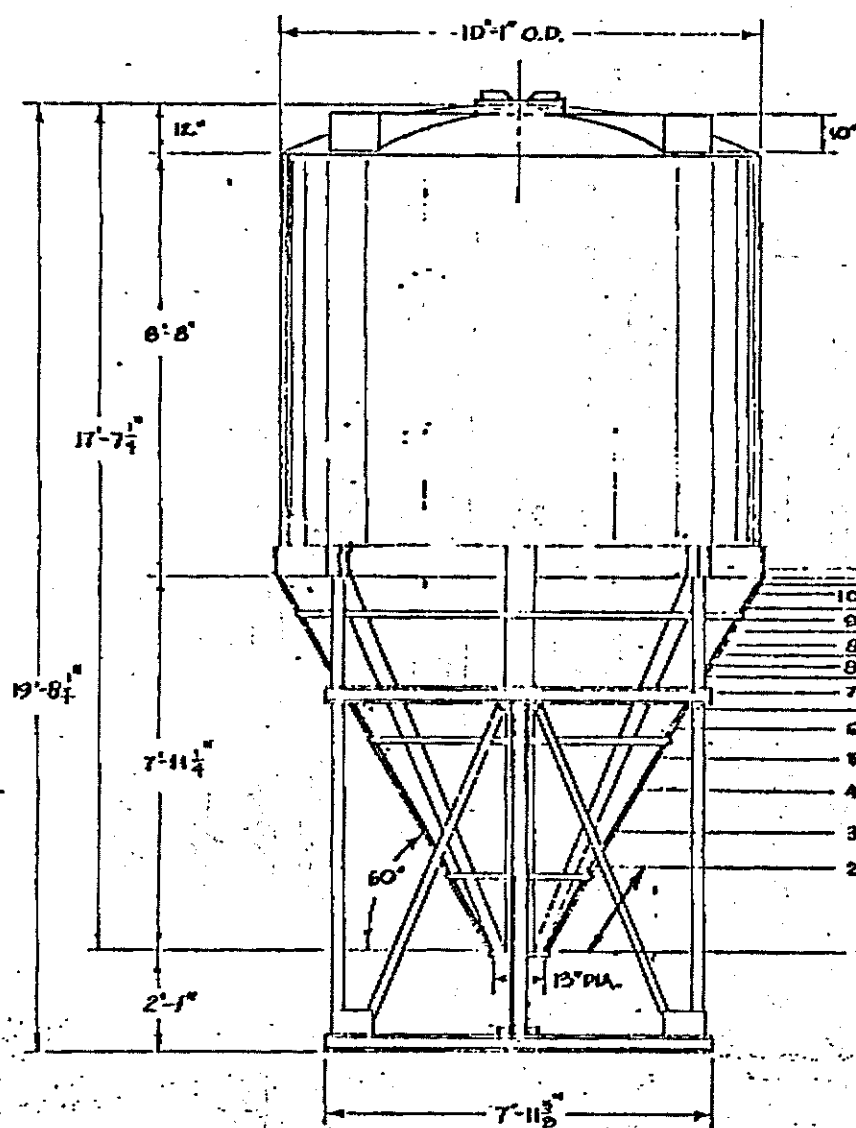
P. O. Box 951, Statesville, NC USA 28677 • Tel.: 704/872-3681 • Telex 810 625-0795

Northern Agent: Thos. F. Root, P. O. Box 11, Plymouth, OH 44865, Tel. 419/667-8611 • West Coast: Walter C. Stoll & Sons, P. O. Box 32186, Los Angeles, CA 90032, Tel. 213/222-1141 • Australasia: Seward Nominees Pty. Ltd., Nunawading, Vic. 3131, Australia, Tel. 878-6644 •

SLUDGE HOLDING TANKS

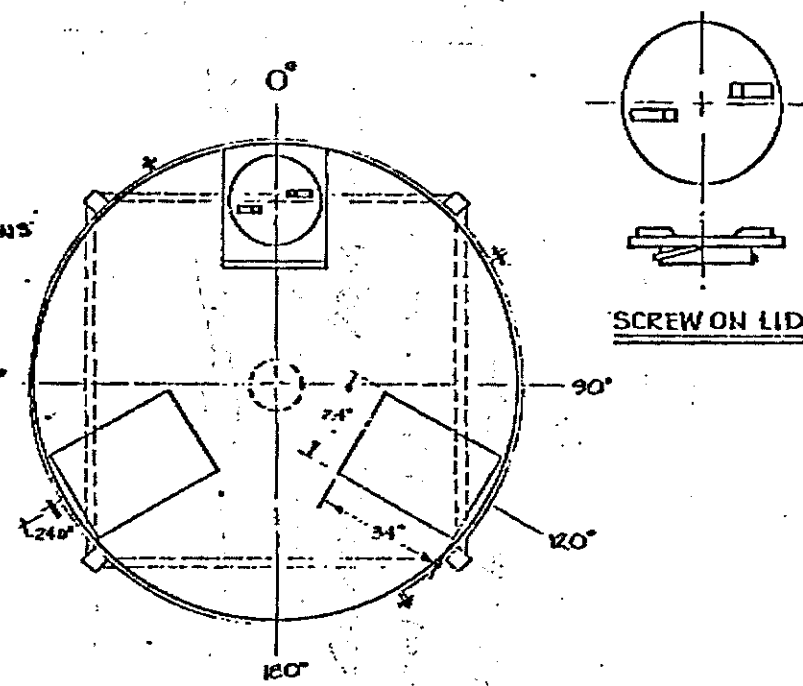
P.O. 3

116L 3 3



9'-11" x 2" DEEP
EQUALS 100 GALLONS

	GALLONS
106"	1700
103"	1550
98 1/2"	1350
95 1/2"	1250
92 1/2"	1150
89 1/2"	1050
86 1/2"	950
83 1/2"	850
80 1/2"	750
77 1/2"	650
74 1/2"	550
71 1/2"	450
68 1/2"	350
65 1/2"	250
62 1/2"	150
59 1/2"	100
56 1/2"	50
53 1/2"	0



HEIGHT OF TANK: 17'-6"

4-21-54 PH

CAPACITY: 7000 GALLONS

STOCK No. SP 22

ER: 9'-11" O.D.

LENGTH: 19'-8 1/4" w/BASKET/STAND

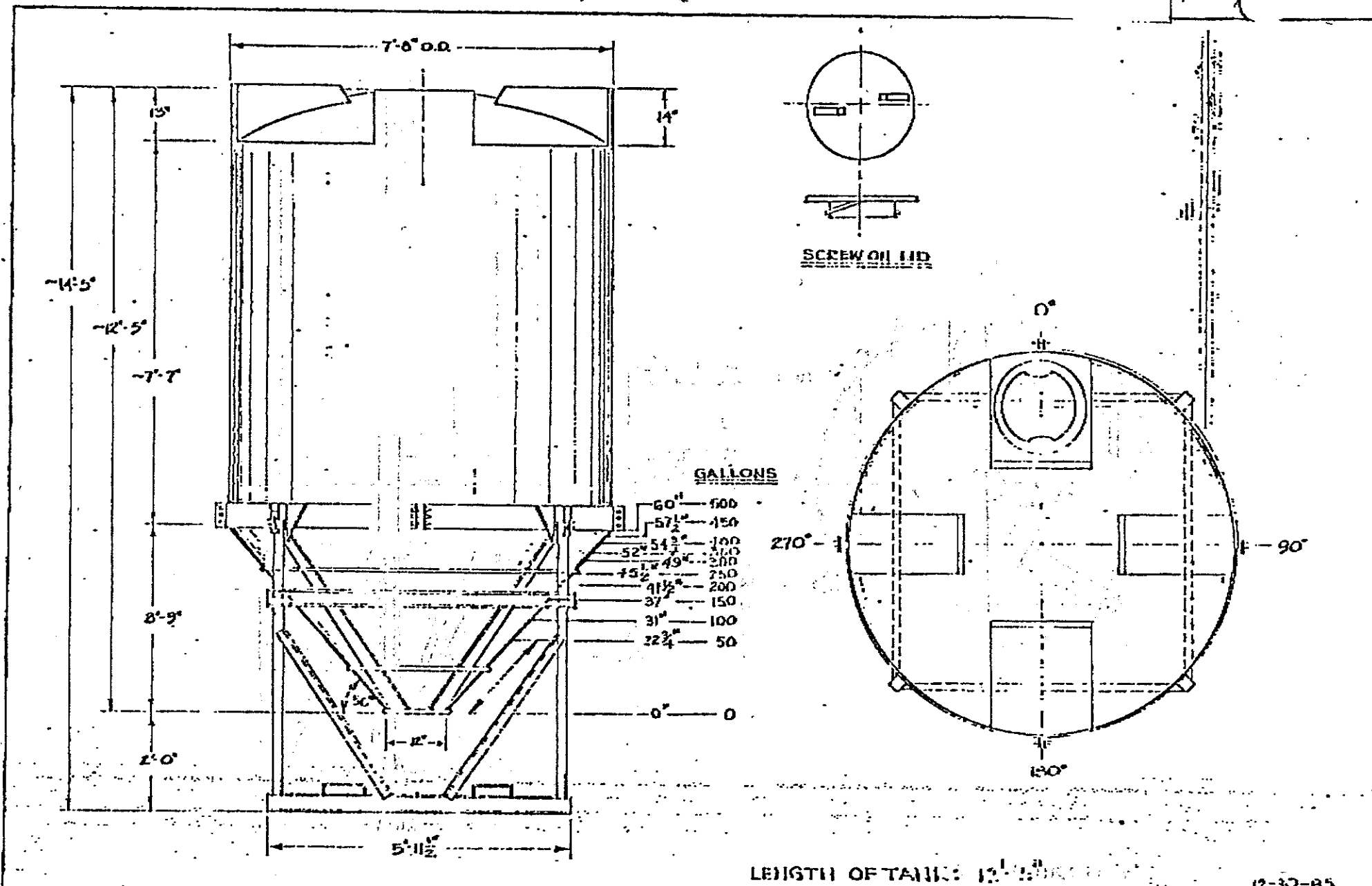


POLY-CAL PLASTICS, INC.

8055 South Ash Street
P.O. Box E
French Camp, Calif. 95231
Stockton Exchange (209) 982-4904

P-02

0-89 WED 1:34



LENGTH OF TANK: 12'-0"

12-30-85

CAPACITY: 3000 GALLONS	STOCK No. SP 34		POLY-CAL PLASTICS, INC. 8015 South Ash Street P.O. Box E French Camp, Calif. 95231 Stockton Exchange (209) 982-4904
ETER: T-8 O.D.	LENGTH: 14'-5" W/BASKET/STAND		
	PARWAY OPENING: 19" Ø		

BAGHOUSE



SEACO
PH. 702 358-8098 -- BOX 558
SPARKS, NEVADA 89432
Gary Seavy, Distributor

FILTREXTM



Fabric Dust Collectors

**"THE SOLUTION
TO ANY DRY DUST
COLLECTION
PROBLEM"**

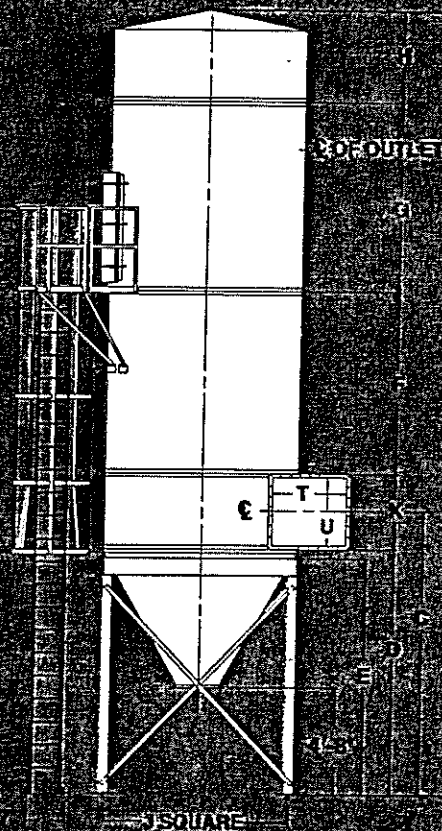
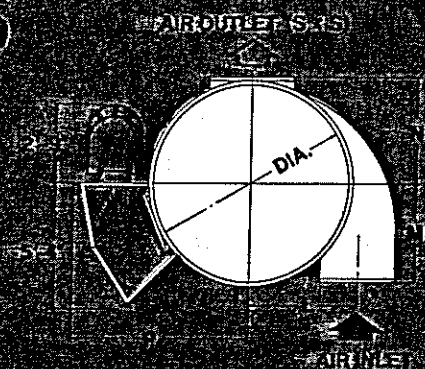


FILTRERX™

FABRIC DUST COLLECTORS

Model S

Reverse Jet Fabric Dust Collector



- Continuous Duty Operation
- Walk-In Service Plenum
- Top Tube Removal
- Snap-Back Tube Collars
- Steel Safety Ladder And Plenum Access Platform
- Bolt-Together Welded Sub-Assembly Sections
- Cyclonic Pre-Cleaners With Barfin Construction
- Field Rotatable And Reversible Inlet Position And Field Rotatable Outlet Position

- Hopper Access Port
- Hinged Reinforced Service Plenum Access Door
- Flanged Hopper Discharge
- Pre-Assembled Reverse Jet Cleaning Air System
- Energy Efficient Continuous Operating Overhead Mounted Pressure Blower
- Single Arm Continuous Rotating Air Manifold With Permanently Lubricated Bearing
- Precisely Calibrated Reverse Jet Cleaning Air Fan
- Continuous Welded Pipe Sheet

FILTER SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	S	T	U	DIA.	CLEANING BLOWER H.P.	SHIP WGT.
4-40-198	24'-3"	21'-5"	9'-0"	8'-1"	7'-9"	4'-4"	3'-4"	1'-8"	4'-5"	1'-10"	2'-10"	2'-4"	2'-8"	5'-10"	2'-0"	1'-5"	1'-5"	4'-8"	5	4,500
6-40-296	26'-3"	23'-5"	9'-0"	8'-1"	7'-9"	6'-4"	5'-4"	1'-5"	4'-5"	1'-10"	2'-10"	2'-4"	2'-8"	5'-10"	2'-0"	1'-5"	1'-5"	4'-8"	5	4,700
8-40-395	28'-3"	25'-5"	9'-0"	8'-1"	7'-9"	8'-4"	6'-4"	1'-5"	4'-5"	1'-10"	2'-10"	2'-4"	2'-8"	5'-10"	2'-0"	1'-5"	1'-5"	4'-8"	5	4,900
4-108-534	28'-7"	22'-7"	10'-2"	9'-0"	8'-7"	4'-4"	3'-4"	1'-5"	6'-5"	2'-4"	3'-7"	3'-4"	3'-8"	6'-10"	2'-4"	2'-8"	2'-0"	6'-8"	5	6,100
6-108-800	27'-7"	24'-7"	10'-2"	9'-0"	8'-7"	6'-4"	5'-4"	1'-5"	6'-5"	2'-4"	3'-7"	3'-4"	3'-8"	6'-10"	2'-4"	2'-8"	2'-0"	6'-8"	5	6,500
8-108-1067	29'-7"	26'-7"	10'-2"	9'-0"	8'-7"	8'-4"	6'-4"	1'-5"	6'-5"	2'-4"	3'-7"	3'-4"	3'-8"	6'-10"	2'-4"	2'-8"	2'-0"	6'-8"	5	6,900
10-108-1334	33'-5"	28'-7"	10'-2"	9'-0"	8'-7"	10'-4"	8'-4"	3'-4"	6'-5"	2'-4"	3'-7"	3'-4"	3'-8"	6'-10"	2'-4"	2'-8"	2'-0"	6'-8"	5	7,500
6-200-1482	30'-8"	26'-8"	12'-4"	10'-8"	10'-4"	6'-4"	5'-4"	1'-10"	8'-3"	3'-4"	4'-9"	4'-4"	4'-8"	7'-9"	3'-9"	3'-4"	3'-0"	8'-8"	7.5	9,400
8-200-1976	32'-8"	28'-8"	12'-4"	10'-8"	10'-4"	8'-4"	6'-4"	1'-10"	8'-3"	3'-4"	4'-9"	4'-4"	4'-8"	7'-9"	3'-9"	3'-4"	3'-0"	8'-8"	7.5	10,000
10-200-2470	36'-6"	30'-8"	12'-4"	10'-8"	10'-4"	10'-4"	8'-4"	3'-8"	8'-3"	3'-4"	4'-8"	4'-4"	4'-8"	7'-9"	3'-9"	3'-4"	3'-0"	8'-8"	7.5	10,800
6-384-2845	34'-8"	29'-11"	15'-6"	13'-4"	12'-11"	6'-4"	5'-4"	2'-3"	11'-1"	4'-4"	6'-9"	5'-10"	6'-2"	9'-3"	4'-5"	4'-0"	4'-0"	11'-8"	10	14,500
8-384-3794	36'-8"	31'-11"	15'-6"	13'-4"	12'-11"	8'-4"	6'-4"	2'-3"	11'-1"	4'-4"	6'-9"	5'-10"	6'-2"	9'-3"	4'-5"	4'-0"	4'-0"	11'-8"	10	15,400
10-384-4742	40'-6"	33'-11"	15'-6"	13'-4"	12'-11"	10'-4"	8'-4"	4'-1"	11'-1"	4'-4"	6'-9"	5'-10"	6'-2"	9'-3"	4'-5"	4'-0"	4'-0"	11'-8"	10	16,600
8-544-5375	39'-4"	34'-1"	17'-7"	15'-1"	14'-8"	8'-4"	6'-4"	2'-6"	13'-0"	5'-0"	7'-5"	6'-10"	7'-2"	10'-4"	5'-3"	4'-8"	4'-8"	13'-3"	15	19,500
10-544-6718	43'-2"	36'-1"	17'-7"	15'-1"	14'-8"	10'-4"	8'-4"	4'-4"	13'-0"	5'-0"	7'-5"	6'-10"	7'-2"	10'-4"	5'-3"	4'-8"	4'-8"	13'-3"	15	21,100

SLUDGE DRYERS

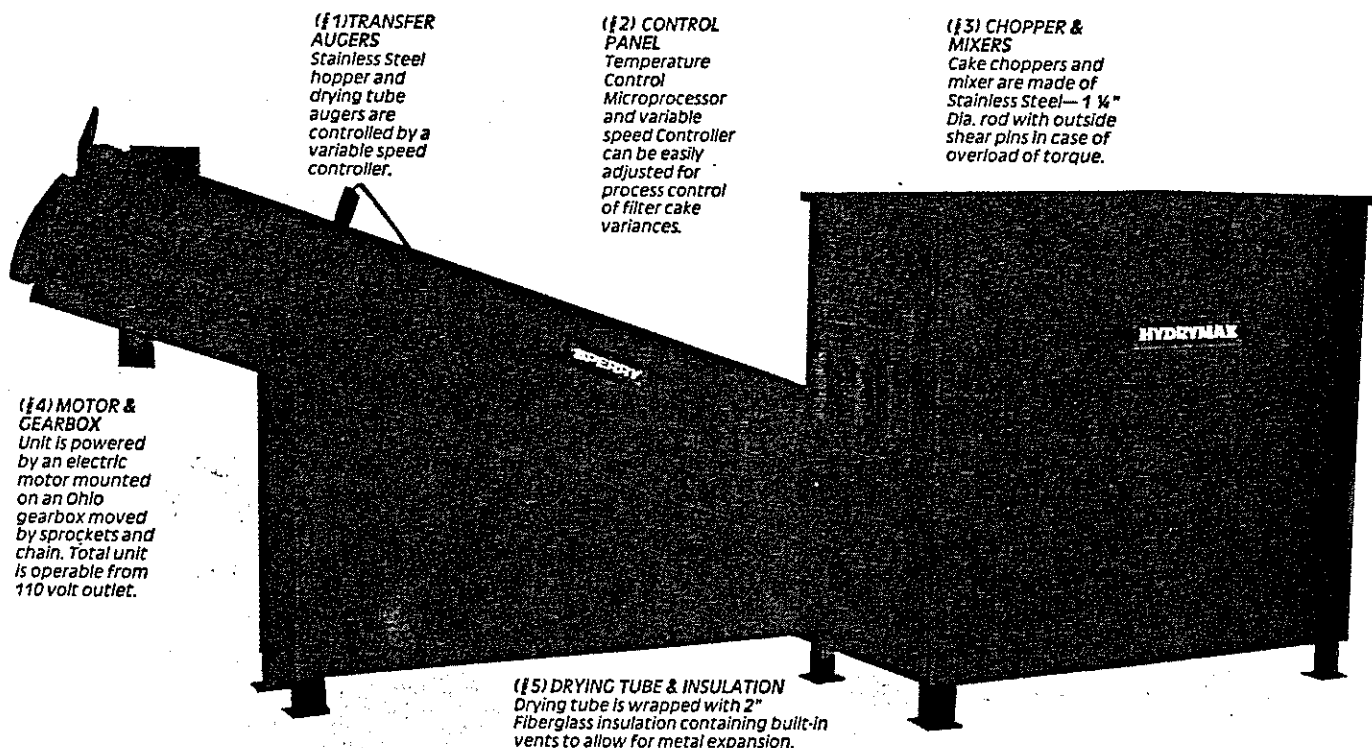
Reduce the heavy cost/responsibility of waste disposal.

Sperry's HYDRYMAX® Sludge Dryers are designed to meet your needs... Waste solids are reduced to a powder dry residue. Complete dehydration results in bulk weight and volume reduction of 75% and more. Immediate substantial savings are realized through lower disposal/handling costs. Additional long term benefits can be realized through reduced RCRA liability/responsibility.

HYDRYMAX® CONTINUOUS FEED Sludge Dryer

Minimum controls required. Unit holding hopper feeds continual supply of sludge to drying tube—add additional material at anytime during operation. Hopper can be filled to maximum capacity and left to run with only periodic inspection. Available as free standing, or locate under new/existing filter press. Unit Heating: Natural Gas or Propane (Electric units can be made available upon request).

Stainless Steel variable speed auger moves sludge through dryer tube exposing all surfaces to heat and air. High temperatures within the burner tube causes complete dehydration reducing sludge material to a dried granular residue.



(#1) TRANSFER AUGERS
Stainless Steel hopper and drying tube augers are controlled by a variable speed controller.

(#2) CONTROL PANEL
Temperature Control Microprocessor and variable speed Controller can be easily adjusted for process control of filter cake variances.

(#3) CHOPPER & MIXERS
Cake choppers and mixer are made of Stainless Steel—1 1/2" Dia. rod with outside shear pins in case of overload of torque.

(#4) MOTOR & GEARBOX
Unit is powered by an electric motor mounted on an Ohio gearbox moved by sprockets and chain. Total unit is operable from 110 volt outlet.

(#5) DRYING TUBE & INSULATION
Drying tube is wrapped with 2" Fiberglass insulation containing built-in vents to allow for metal expansion.

HYDRYMAX® Accessory Options — Available from D. R. Sperry & Co.

• REMOTE CONTROL PANELS

Special Control Panels for mounting away from unit as needed or desired, are available for both BATCH FEED or CONTINUOUS FEED DRYERS.

• AIR BLOWER

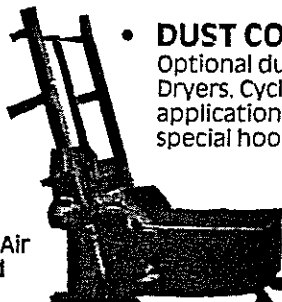
Gas heated Batch Feed Dryers require consistent volume and air pressure to obtain heat from combustion. Sperry Air Blowers are available where needed and can be mounted on dryer unit.

• DUST COLLECTORS

Optional dust collectors are available for Continuous Feed Dryers. Cyclone dust traps are acceptable for most applications. High efficiency Bag House Collectors with special hood also available.

• PIVOT DUMPERS AND CARTS

For Direct Dumping.... Fully automatic Pivot Dumpers and Carts available to fit all Sperry Dryers.





HYDRYMAX INDIRECT HEAT DEHYDRATION SYSTEM

MODEL	PROCESS CAPACITY CU FT/HR	MAX BTU	# H ₂ O REMOVAL PER/HR	DIMENSION INCHES H x L x W	EQUIPMENT COST
C5	1/3-3/4	100,000	24.4	120x60x55	\$18,950.00
C15	3/4-1 1/2	225,000	48.8	155x77x63	24,900.00
C30	1 1/2-3	225,000	97.5	155x77x63	34,750.00
C60	3 - 6	420,000	195.0	155x77x63	47,500.00
C120	6 - 12	840,000	390.0	195x120x63	*
C-240	12- 24	1,680,000	780.0	195x240x63	*

HYDRYMAX BATCH DEHYDRATION SYSTEM

MODEL	WORKING CAPACITY CU.FT.	ENERGY REQUIREMENT	DIMENSION INCHES	EQUIPMENT COST
Minimax	1.5	6 KW	60x40x48	\$ 8,695.00
B-5E	5	16 KW	75x65x56	30,156.00
B-5G	5	62K BTU	75x65x56	32,361.00
B-10E	10	32 KW	106x65x50	39,900.00
B-10G	10	125K BTU	106x65x50	43,837.00
B-16E	16	50 KW	93x76x90	*
B-16G	16	300K BTU	93x76x90	*
B-24E	24	82 KW	117x76x90	*
B-24G	24	1,200K BTU	117x76x90	*

AVERAGE CYCLE TIME: 4 HOURS

* Do to custom layouts typically required for these units all quotations will be made on application review.

D. R. SPERRY & CO.

112 Grant St. • North Aurora, Illinois 60542

PELLETIZERS

MMC Mars Mineral Disc Pelletizer



Versatile Pelletizer for a
Wide Range of Applications.
5'5"

The MMC inclined Disc Pelletizer is an adjustable pan device utilized in micro-pelletizing, pelletizing and conditioning applications in which a shallow pan and a smaller retained burden are desired. It can be used to pelletize materials such as taconites, earthy hematites, copper, nickel, lead and zinc concentrates. Other applications include pelletizing of reclaimed sludge, moist filter cakes, coal, flue dusts, fertilizers and ores.

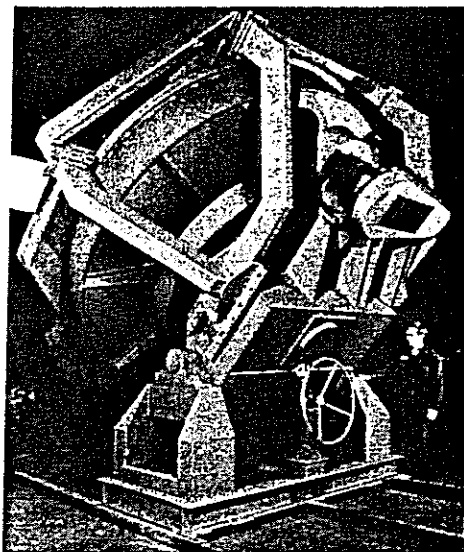
MMC MARS MINERAL

The MMC Disc Pelletizer consists of a pan, drive and plows, which are supported on a heavy structural frame and base.

The pan is driven by an 1800 rpm TEFC motor through a vari-drive belt and heavy-duty gear reducer. It is mounted on the output shaft of the reducer for disc sizes from three feet to eight feet in diameter.

Disc pelletizers 10 feet in diameter and larger are equipped with constant speed cog-belt drives and are driven through motor, reducer, pinion and ring gear mounted behind the pan. Changes in pan rotational speed can be made through the proper selection of sheaves and belts.

The pan angle is adjustable within a range of 20 degrees to suit various pelletizing conditions and applications.



MMC Inclined Disc Pelletizer is equipped with binder-spray system for use in micro-pelletizing, pelletizing or conditioning of a wide range of materials.

Pan speeds of disc pelletizers three feet to eight feet in diameter are variable by a 3:1 ratio.

The MMC Disc Pelletizer is equipped with a binder spray system which includes piping, tubing, nozzles, pressure gauges, valves, pressure regulator and strainer. For extremely dusty or toxic applications, MMC will also provide a dust cover as an optional item.

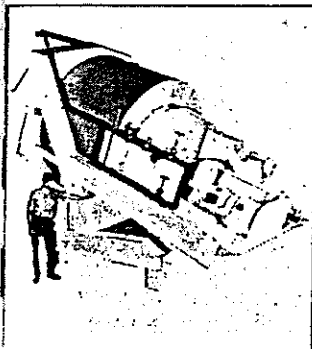
This unit is a front-feeding device. Various feeders are used in conjunction with it to accommodate a range of materials and accuracies. Selection may be made from volumetric screw feeders, belt or table feeders and gravimetric weightbelt feeders.

Disc Pelletizer Specifications

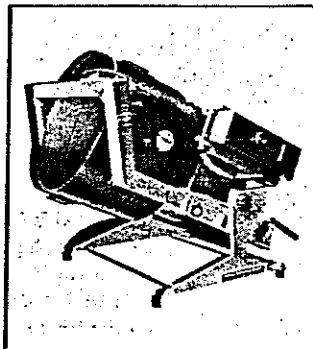
Model	Capacity (TPH)	Disc Diameter	Disc Depth	Disc Drive (HP)	Length	Width	Height	Approximate shipping weight (lbs.)
P30	.75	3 ft.-0 in.	8 in.	1	3 ft.- 5 in.	4 ft.- 1 in.	4 ft.- 3 in.	1,600
P45	2.5	4 ft.-6 in.	9 in.	3	4 ft.- 11 in.	6 ft.- 1 in.	6 ft.- 0 in.	3,800
P60	4.5	6 ft.-0 in.	10 in.	5	7 ft.- 7 in.	7 ft.- 5 in.	7 ft.- 5 in.	6,000
P80	10	8 ft.-0 in.	13 in.	15	6 ft.- 10 in.	9 ft.- 5 in.	9 ft.- 5 in.	12,000
P100	15	10 ft.-0 in.	15½ in.	25	9 ft.- 6 in.	12 ft.- 4 in.	11 ft.- 10 in.	20,000
P120	25	12 ft.-0 in.	17½ in.	40	12 ft.- 0 in.	14 ft.- 4 in.	13 ft.- 7 in.	26,000
P140	37	14 ft.-0 in.	20 in.	60	13 ft.- 5 in.	17 ft.- 0 in.	15 ft.- 10 in.	32,000
P160	56	16 ft.-0 in.	22 in.	75	14 ft.- 4 in.	19 ft.- 0 in.	17 ft.- 0 in.	42,000
P180	75	18 ft.-0 in.	24 in.	100	15 ft.- 6 in.	21 ft.- 0 in.	18 ft.- 8 in.	50,000
P200	100	20 ft.-0 in.	26 in.	125	16 ft.- 10 in.	23 ft.- 0 in.	21 ft.- 4 in.	60,000
P220	125	22 ft.-0 in.	28 in.	150	19 ft.- 1 in.	25 ft.- 6 in.	24 ft.- 5 in.	100,000
P250	140	25 ft.-0 in.	32 in.	250	21 ft.- 2 in.	29 ft.- 0 in.	29 ft.- 11 in.	160,000

Capacity based on free-flowing material feed @ 80 lb./cu. ft. bulk density.

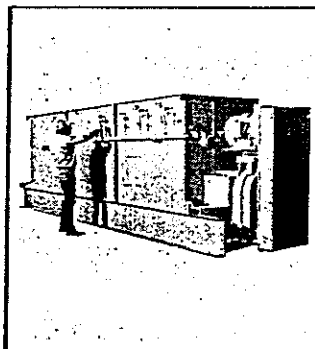
Other Products by MMC Mars Mineral



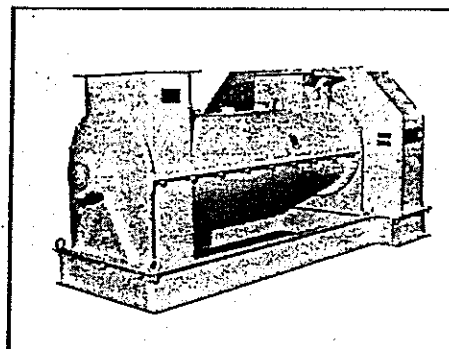
MMC Drum Pelletizer is an inclined, deep-drum unit featuring an integral, rear-mounted auger feeder. It is ideal for densification and production of large-diameter pellets.



MMCDP14 Agglo-Miser laboratory pelletizer is a multi-depth, bench-scale unit that permits a wide range of batch and/or continuous tests for powder and dust pelletizing.



MMC Ampel horizontal pelletizer/conditioner is utilized in applications requiring dedusting or conditioning of dust, fine powders and other materials.



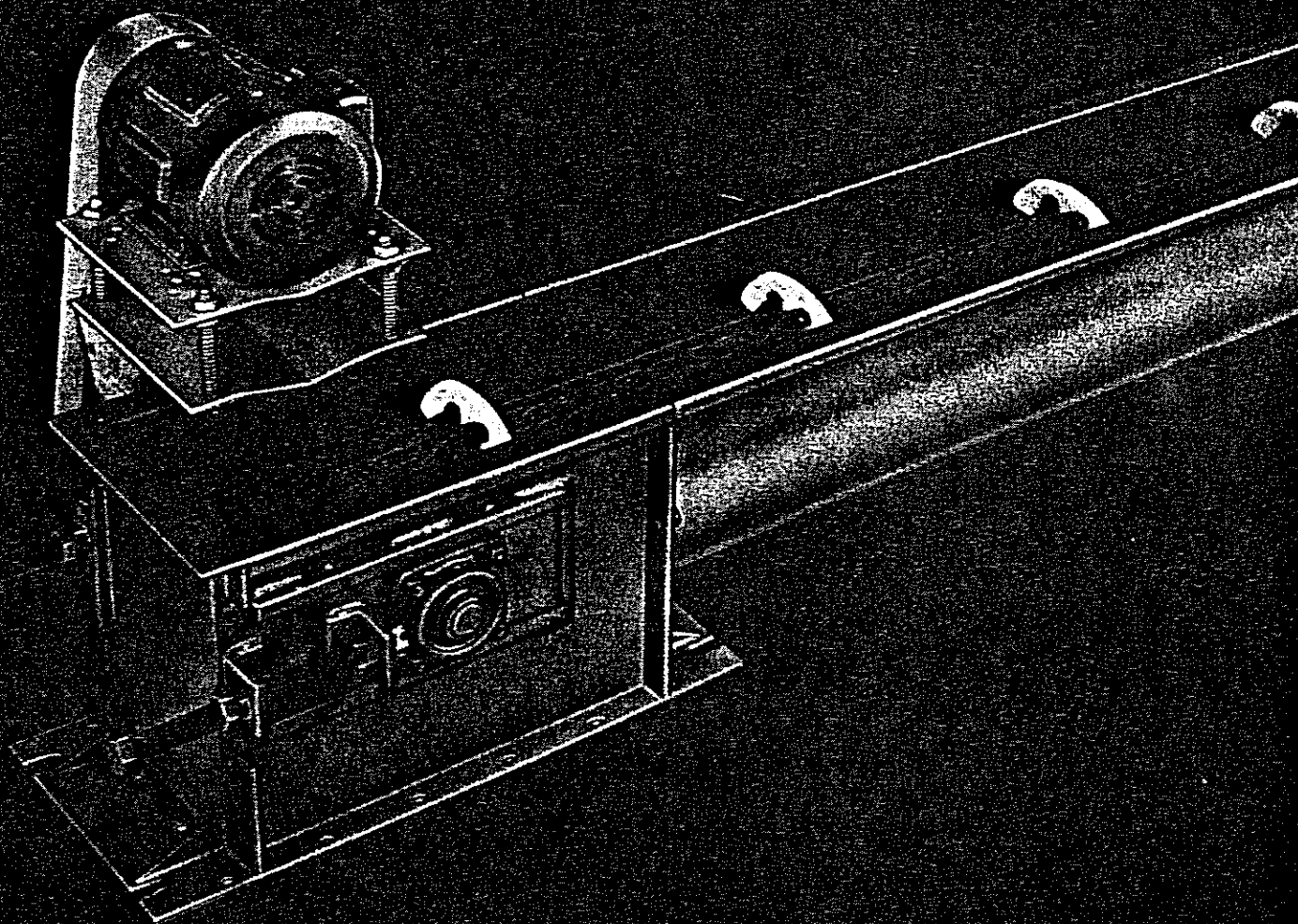
MMC Pin Mixer for advanced pin-type micro-pelletizing. This new design from MMC is ideal for dedusting/dust wetting, solids/liquid mixing, preconditioning, chemical reactions and fluffing.

MMC MARS MINERAL

P. O. Box 719 • Mars, PA 16046 • Phone 412/538-3000 • Telex: 866452

CONVEYORS

Super-Flo[®] Conveyor for Dependable Service



THE EXPERIENCE
TO HANDLE IT RIGHT!™

Screw Conveyor Corporation

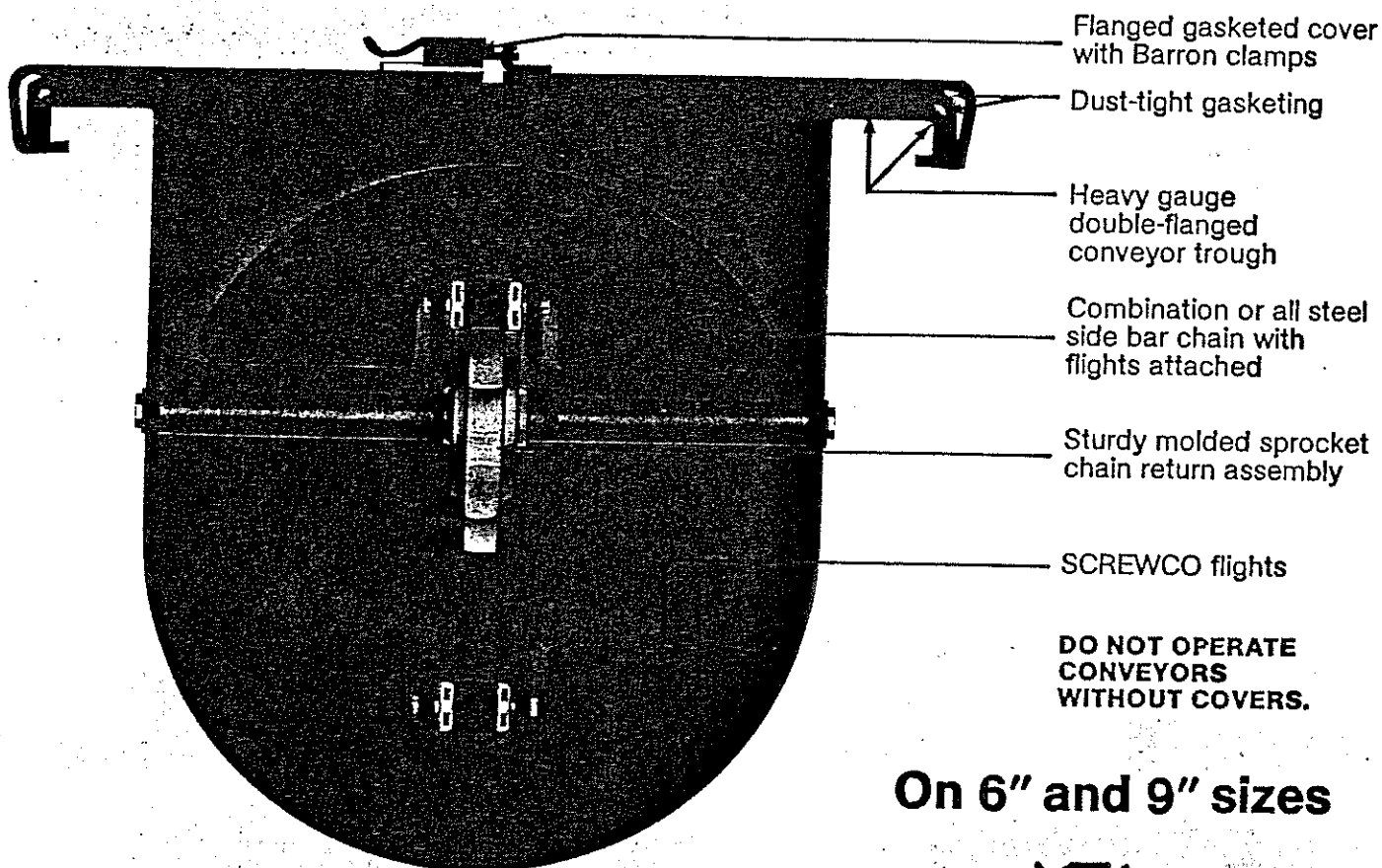
Manufacturing Plants and Sales Offices: Winona, Mississippi; Visalia, California; Chanute, Kansas; Hammond, Indiana. Sales Office: Atlanta, Georgia.

Super-Flo® Conveyor's Unique Trough and Cover Provide Dust-tight Protection and Easy Access.

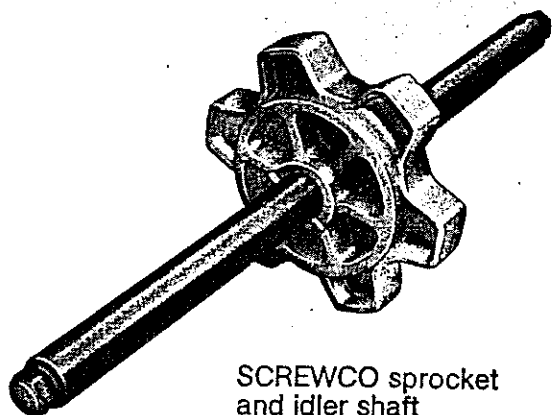
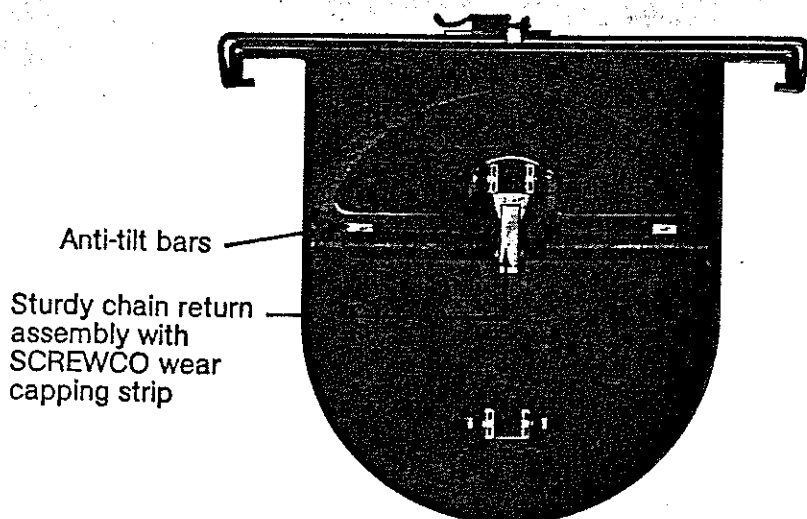
The Super-Flo conveyor trough is deeper than the conventional screw conveyor trough. Its double-flanged, one-piece trough design offers many advantages. The double flanges provide greater strength and structural rigidity with a decrease in weight. One-piece construction also eliminates any possible gaps where material leakage might occur. Increased rigidity helps assure straighter and more accurate trough alignment.

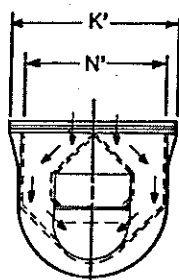
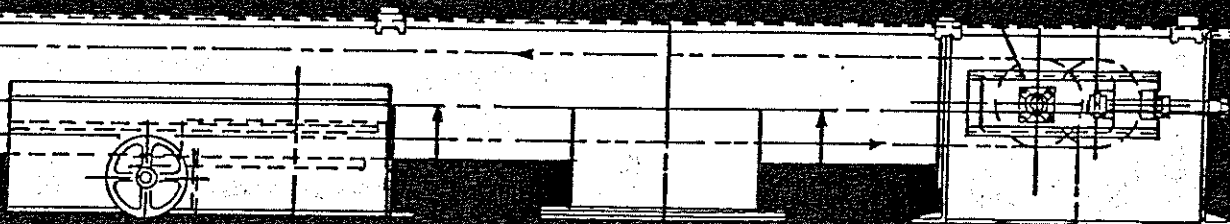
The flanged cover fits snugly over the double flanges of the trough, with a highly resilient self-adhering gasket continuously fitted between the trough and the cover. The Barron clamp can be released quickly with your fingers, for immediate access to the inside for inspection or maintenance.

On 12" and larger sizes

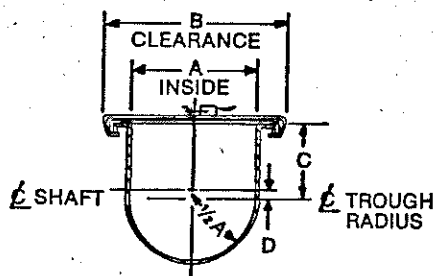


On 6" and 9" sizes





SECTION "Z-Z"
STANDARD DIVIDED FLOW INLET



TYPICAL SECTION
THRU TROUGH

NOTE: Dimensions in white section
refer only to diagrams in white
section.

Dim. in inches	SUPER-FLO SIZES									
	6"	9"	12"	14"	16"	18"	20"	24"	30"	36"
A'	1 ¹ / ₁₆	1/2	3/8	7/8	7/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
B'	4 3/8	4	4 3/8	4 3/8	5 1/4	4 3/8	4 3/8	4 3/8	5 5/8	5 5/8
C'	—	3 7/8	4 3/4	4 3/8	5 1/4	4 3/8	4 3/4	4 3/4	5 1/2	5 1/2
D'	4 3/8	4	4 1/2	—	5 1/4	4 1/2	4 1/4	4 1/4	5 1/2	5 1/2
E'	7/16	7/16	7/16	7/16	7/16	9/16	9/16	9/16	9/16	9/16
F'	14	16	16	20	20	24	24	24	24	24
G'	12	16	16	20	20	24	24	24	24	24
H'	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
J'	12	14	14	18	18	22	22	22	24	24
K'	16	21	24	27	30	33	36	40	48	56
L'	13	15	17	19	19	21	21	23	28	33
M'	10	12	14	16	16	18	18	20	25	30
N'	13	18	21	24	27	30	33	37	45	53
O'	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8
P'	5	4 ¹⁵ / ₁₆	5 ¹¹ / ₁₆	5	5 3/4	4 1/2	5	5 1/2	6 3/4	7 7/8
Q'	4 3/4	—	—	5 3/4	—	4 3/4	4 3/4	5 3/4	6 3/4	7 1/2
R'	4	4 1/2	5 1/4	4 7/8	4 7/8	4 ¹⁵ / ₁₆	4 ¹⁵ / ₁₆	5 ¹⁵ / ₁₆	5 5/8	6 3/8
S'	3 3/4	4 3/4	—	—	—	—	—	—	5 1/4	6 1/4

Dimensions in inches	SUPER-FLO SIZES									
	6"	9"	12"	14"	16"	18"	20"	24"	30"	36"
A	7	10	13	15	17	19	21	25	31	37
B	12	15 1/4	19 1/2	21 1/2	23 1/2	26 1/2	28 1/2	32 1/2	36 3/4	42 3/4
C	5 3/4	6 3/8	8 1/4	9 3/4	11 1/4	12 5/8	14	17	23 1/2	27 3/8
D	1 1/16	3/4	1 1/16	1 1/16	1 1/4	1 1/2	1 11/16	2 3/16	3	3 3/16
E	20 3/4	26 1/2	30 3/4	33 3/4	36 3/4	39 3/4	42 3/4	43 3/4	49 1/4	49 1/4
F	9 3/4	13 1/2	17 3/4	19 3/4	21 3/4	24 3/4	26 3/4	30 3/4	36 3/8	42 3/8
G	15	18	21	24	26	28	30	30	36	36
H	2	3 1/4	3 3/8	3 1/2	3 3/8	4 1/8	4 3/8	5 1/8	4 3/8	4 3/8
J	4 3/16	4	4 3/4	4 3/8	5 3/4	4 3/8	4 3/4	4 3/4	5 3/4	5 3/4
K	4 3/16	4	4 3/4	4 3/8	5 3/4	4 3/8	4 3/4	4 3/4	5 3/4	5 3/4
L	—	4	4 1/2	—	5 1/2	4 3/4	4 1/2	4 1/2	6	6
M	9/16	3/4	7/8	7/8	7/8	1 1/8	1 1/8	1 1/8	1 3/16	1 3/16
N	2 13/16	4	5 1/8	4 3/8	3 3/4	4 7/16	4 7/8	5 5/8	6 3/4	8
O	—	—	—	4 3/8	4	4 3/8	4 3/4	5 5/8	6 3/4	8
P	3	4	5 1/4	—	4	4 3/8	4 3/4	5 1/2	7	8
Q	13/16	2 1/16	2 1/2	2 7/8	3 3/16	4 1/8	3 1/2	5 1/8	6 3/16	6 3/16
R	8 3/8	9 3/8	12 1/4	13 1/2	14 7/8	16	19 1/4	20	24	30
S	3/8	1/2	5/8	5/8	5/8	5/8	3/4	3/4	3/4	3/4
T	5/8	1 1/16	1 1/8	1 1/8	1 1/4	1 1/4	1 1/2	1 3/4	1 3/4	1 3/4
U	14 3/4	20 3/4	25	28	28	33	35	35	41	41
V	10	13	17 1/4	19 1/4	21 1/4	24 1/4	26 1/4	30 1/4	36 1/4	42 1/4
W	7 1/4	10 1/4	13 1/4	15 1/4	17 1/4	19 1/4	21 1/4	25 1/4	31 3/8	37 3/8
X	12	18	21	24	24	28	30	30	36	36

CONTAINERS

Self-Dumping Hoppers For Fork Lift Use

Applications:

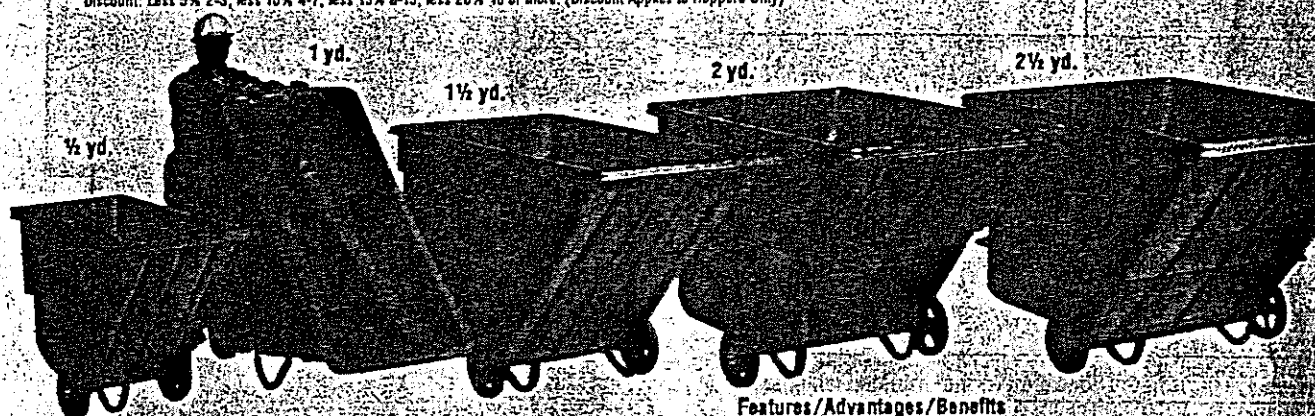
Self-Dumping Hoppers include the features of the Tilt Truck with fork lift capabilities for elevated dumping.

Typical Uses:

- Waste container for food processing scrap.
- Dumping food ingredients into cooking or mixing vats.
- Compounding chemical powders, resins, and granular materials.
- Bottle and can catch in breweries and canneries.
- Bulk handling of refuse.

No.	Description	Dimensions LxWxDW	Shipping HxWxLb	Capacity Cu. Ft.	Capacity Wt. 7 Lbs.	Price Each
Standard Self-Dumping Hoppers - Dry						
61200	10' Dia. 10' Self-Dumping Hopper	56 1/2 x 27 1/2 x 40 1/2	31 1/2 x 18 1/2 x 31 1/2	58 1/2	1000	\$715.00
61202	12' Dia. 10' Self-Dumping Hopper	70 1/2 x 31 1/2 x 49 1/2	39 1/2 x 23 1/2 x 37 1/2	77 1/2	1000	\$831.50
61204	14' Dia. 10' Self-Dumping Hopper	84 1/2 x 35 1/2 x 59 1/2	45 1/2 x 29 1/2 x 45 1/2	100 1/2	1000	\$900.50
61206	16' Dia. 10' Self-Dumping Hopper	98 1/2 x 39 1/2 x 69 1/2	53 1/2 x 33 1/2 x 53 1/2	128 1/2	1000	\$978.50
61208	18' Dia. 10' Self-Dumping Hopper	112 1/2 x 55 1/2 x 79 1/2	61 1/2 x 41 1/2 x 61 1/2	160 1/2	1000	\$1071.50
Upbank 11d. - Dry						
61201	10' Dia. 10' Self-Dumping Hopper	56 1/2 x 27 1/2 x 40 1/2	31 1/2 x 18 1/2 x 31 1/2	58 1/2	1000	\$83.50
61203	12' Dia. 10' Self-Dumping Hopper	70 1/2 x 31 1/2 x 49 1/2	39 1/2 x 23 1/2 x 37 1/2	77 1/2	1000	\$93.50
Upbank 11d. - Full Dry Self-Dumping Hoppers						
61205	14' Dia. 10' Self-Dumping Hopper	84 1/2 x 35 1/2 x 59 1/2	45 1/2 x 29 1/2 x 45 1/2	100 1/2	1000	\$212.50

Discount: less 5% 2-3; less 10% 4-7; less 15% 8-15; less 20% 16 or more. (Discount Applies to Hoppers Only)



Tilt Trucks

Applications:

Designed for any type of refuse collection. Single operator can roll truck from collector stations to compactor, baller, or dock containers and quickly dump waste.

Features/Advantages/Benefits

- Easily maneuverable—weighs much less than metal.
- Smooth seamless body prevents bacteria growth and is easily cleaned with high pressure water or steam.
- Polyethylene will not pit or corrode like steel.
- Hinged lids available to meet OSHA and sanitary requirements.

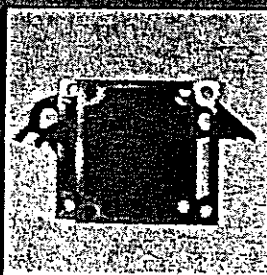
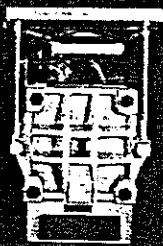
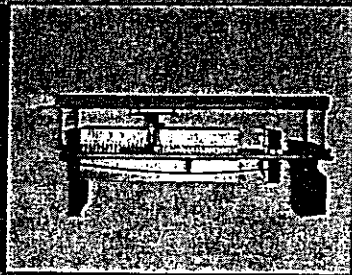
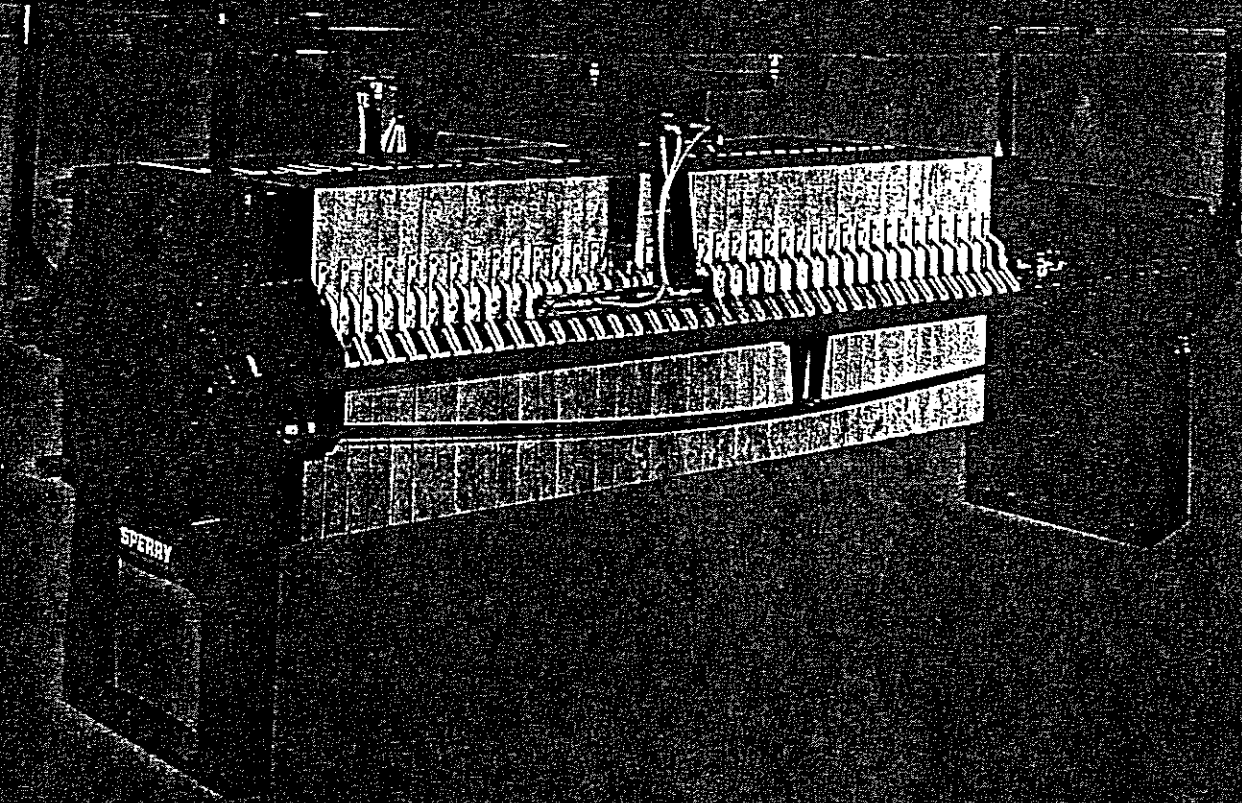
Part No.	Description	Color	Capacity	Dimensions L x W x H	Weight
61510CJ	1-Cubic Yard Tilt Trucks (13.5 cu. ft., 300 gal. capacity)				
61510CJ	Utility Tilt Truck	Gray	300 lbs.	52 1/2" x 27 1/2" x 37 1/2"	115
	2-40" Semi-Pneumatic Rubber Wheels, 1-Rear Caster				
61515CJ	Standard Tilt Truck	Gray	500 lbs.	52 1/2" x 27 1/2" x 37 1/2"	130
	2-20" Vulcanized Rubber Wheels, 2-Rear Casters				
61519CJ	Heavy-Duty Tilt Truck	Gray	1200 lbs.	52 1/2" x 27 1/2" x 37 1/2"	177
	2-40" Vulcanized Rubber Wheels, 2-Casters, Side Rails				
61521CJ	Optional 13d	Gray			
	Fits all 1/2 Cu. Yd. Tilt Trucks				
1-Cubic Yard Tilt Trucks (27 cu. ft., 200 gal. capacity)					
61523CJ	Utility Tilt Truck	Gray	700 lbs.	70" x 32 1/2" x 41 1/2"	175
	2-12" Semi-Pneumatic Rubber Wheels, 2-Rear Casters				
61527CJ	Standard Tilt Truck	Gray	1000 lbs.	70" x 32 1/2" x 41 1/2"	205
	2-12" Vulcanized Rubber Wheels, 2-Rear Casters				
61530CJ	Heavy-Duty Tilt Truck	Gray	2500 lbs.	70" x 32 1/2" x 41 1/2"	243
	2-40" Vulcanized Rubber Wheels, 2-Heavy-Duty Casters, Side Rails				
61533CJ	Optional 13d	Gray			111
	Fits all 1 1/2 Cu. Yd. Tilt Trucks				
1 1/2-Cubic Yard Tilt Trucks (40.5 cu. ft., 303 gal. capacity)					
61535CJ	Standard Tilt Truck	Gray	1000 lbs.	74 1/2" x 30" x 40"	210
	2-12" Vulcanized Rubber Wheels, 2-Casters				
61537CJ	Heavy-Duty Tilt Truck	Gray	2000 lbs.	74 1/2" x 30" x 40"	210
	2-12" Vulcanized Rubber Wheels, 2-Casters, Side Rails				
61539CJ	Optional 13d	Gray			205
	Fits all 1 1/2 Cu. Yd. Tilt Trucks				
2-Cubic Yard Tilt Trucks (54 cu. ft., 404 gal. capacity)					
61540CJ	Standard Tilt Truck	Gray	1800 lbs.	84 1/2" x 46 1/2" x 50 1/2"	255
	2-12" Vulcanized Rubber Wheels, 2-Casters				
61541CJ	Heavy-Duty Tilt Truck	Gray	2300 lbs.	84 1/2" x 46 1/2" x 50 1/2"	272
	2-12" Vulcanized Rubber Wheels, 2-Casters, Side Rails				
2 1/2-Cubic Yard Tilt Trucks (67.5 cu. ft., 505 gal. capacity)					
61550CJ	Standard Tilt Truck	Gray	1800 lbs.	84 1/2" x 55 1/2" x 60 1/2"	283
	2-12" Vulcanized Rubber Wheels, 2-Casters				
61551CJ	Heavy-Duty Tilt Truck	Gray	2300 lbs.	84 1/2" x 55 1/2" x 60 1/2"	286.65
	2-12" Vulcanized Rubber Wheels, 2-Casters, Side Rails				

Discount: Less 5% 2-3; less 10% 4-7; less 15% 8-15; less 20% 16 or more. (Discount Applies to Trucks Only)

FILTER PRESSES

SPERRY

STRENGTH THROUGH A COMMITMENT TO EXCELLENCE

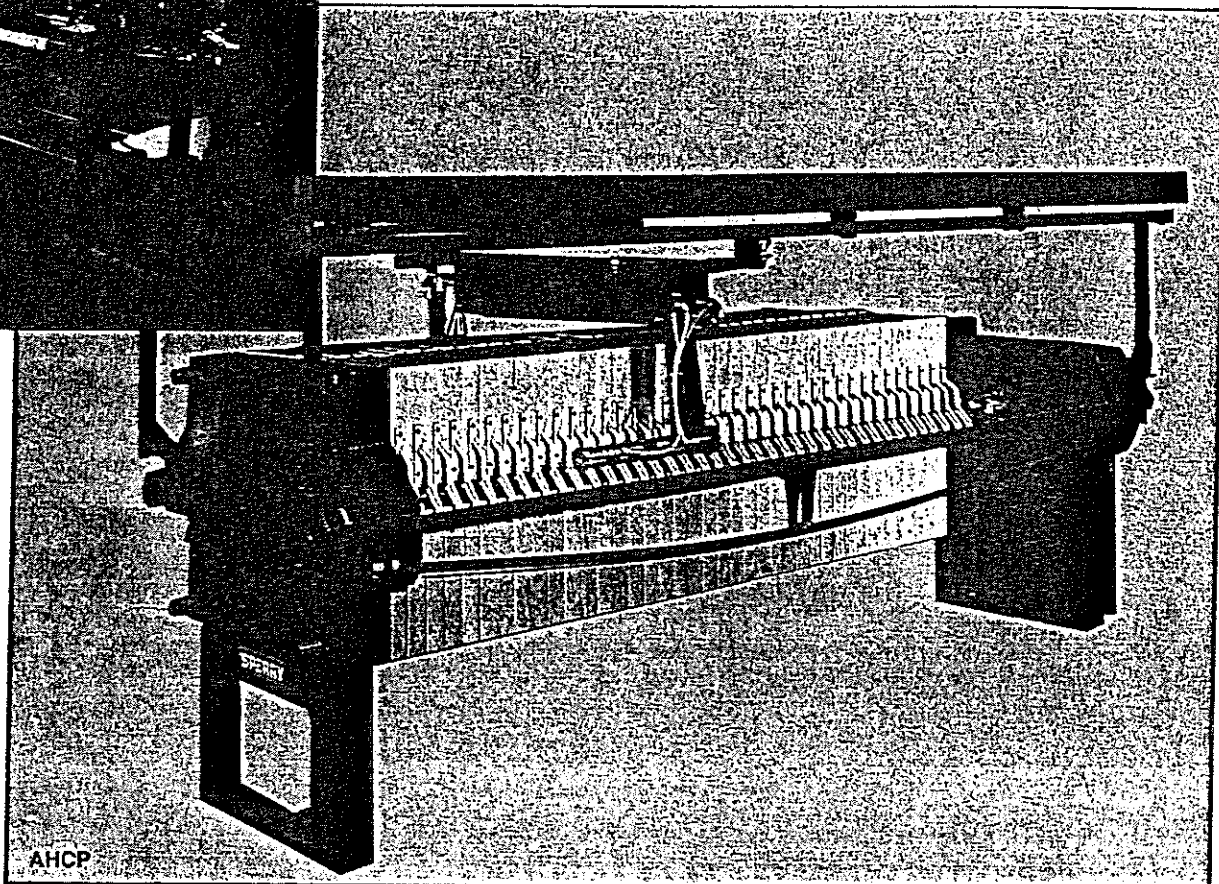
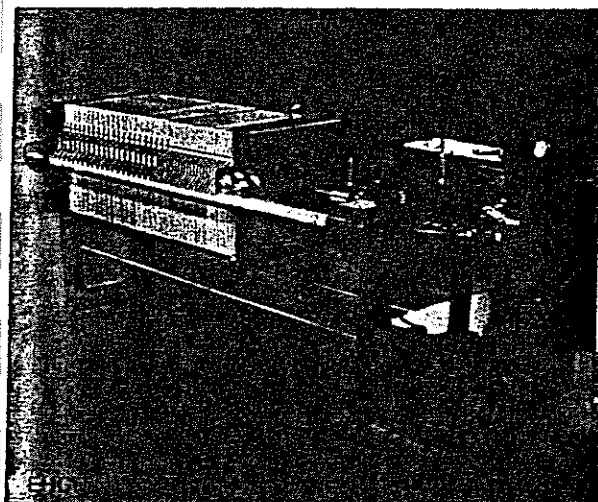


Filtertron Engineers and Filter Press Manufacturers
Specialists in Chemical Processing and Wastewater Treatment

Sperry Filter Presses

Filter press skeletons have three basic functions in the filtration process: 1) They contain the closing (filtration) pressure; 2) They support the filter elements, and 3) They provide the means to open and close the filter elements for cleaning.

With these purposes in mind, all Sperry Filter Press skeletons are based on customer application and operating efficiency and economies.



The basic D.R. Sperry Filter Press types are listed below. While most Sperry Filter Presses are of these types, they do not represent the universe of Sperry Filter Presses. Sperry filtration engineers pride themselves on special applications, and have established their reputation on being able to design a product to meet any filtration need, regardless of how obscure or esoteric. Sperry Filter Presses are available in sizes ranging from

6" to 60". The standard Sperry Filter Press is round sidebar, designed for operation at up to 500 psi. Sperry flat sidebar presses are designed to operate at up to 150 psi. The important point is that all Sperry presses are designed to specifications that *exceed* operating parameters — performance and quality are built in from the engineering drawings through the finished press.

D.R. Sperry Filter Press Type EHCL

EHCL-type presses feature an electric motor driven double-acting hydraulic cylinder closing mechanism equipped with a locking device. Used for automatic opening and closing of the filter elements, EHCL-type filter presses are generally used in applications with long filtration cycles. The locking device insures that the press will not fail due to extended system pressure.

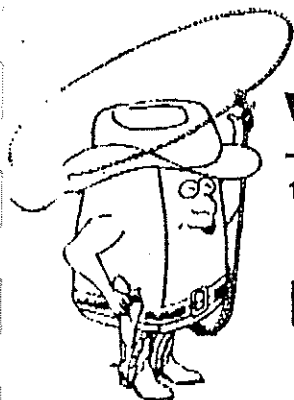
D.R. Sperry Filter Press Type AHCP

AHCP-type presses feature a double-acting hydraulic cylinder which provides constant closing pressure during the filtration cycle. They are generally used in applications requiring shorter filtration cycles (30 minutes — 8/10 hours long).

D.R. Sperry Filter Press Type HHC

HHC-type filter presses feature manually-operated hydraulically-closed closing devices with a locking mechanism. HHC-type filter presses are generally used in filtration applications requiring long cycles and manual operation. HHC-type presses are less expensive than other types of filter presses.

DRIED PRODUCT BAGGERS



WASTE Wrangler

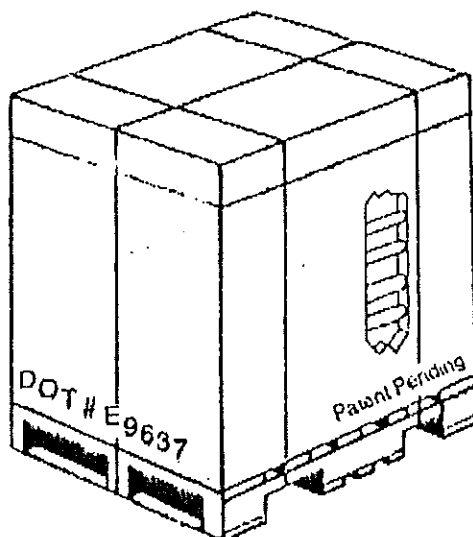
190 Wallace Street • New Haven, CT 06511 • 203-865-5426 • FAX 203 865-8960 • TELEX 964012

INTRODUCING WASTE WRANGLER II*

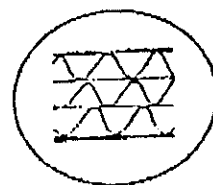
New

DOT approved container for
corrosives and poison B solids

DOT approved vapor
barrier board for outside
and inside liners



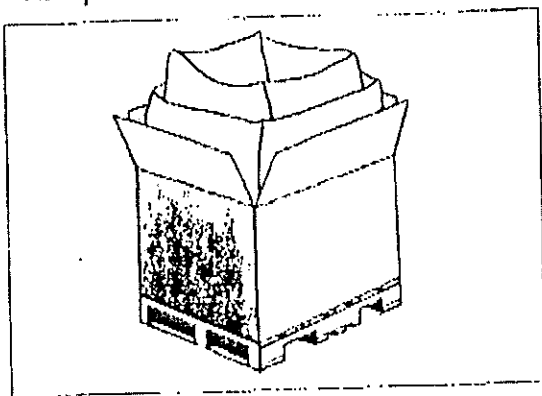
Bands of reinforcing tape
circle the box inside the liner
board for added strength.



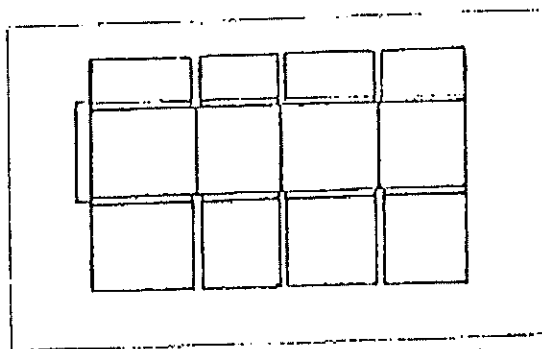
AAA Flute Triple Wall

Features

- Size: 36" x 36" x 36"
- 70% overall cost savings, over using 55 gallon drums for disposal
- DOT approved for corrosives and poison B solids
- Three layer construction dramatically increases puncture resistance over poly liners
- Requires less storage space than drums
- Easy access with 4-way pallet
- Spill-proof design insures safe transport
- Acceptable at over 90% of disposal sites



When used with our polypropylene bulk bag and 6 mil poly liner, this container will handle all your waste storage and transport needs.



The Waste Wrangler ships and is stored flat saving valuable storage space. The slotted container is easily assembled by folding in flaps (bottom flaps overlap and top flaps meet).

*Waste Wrangler is a product of UF Strainrite, Inc., patent pending

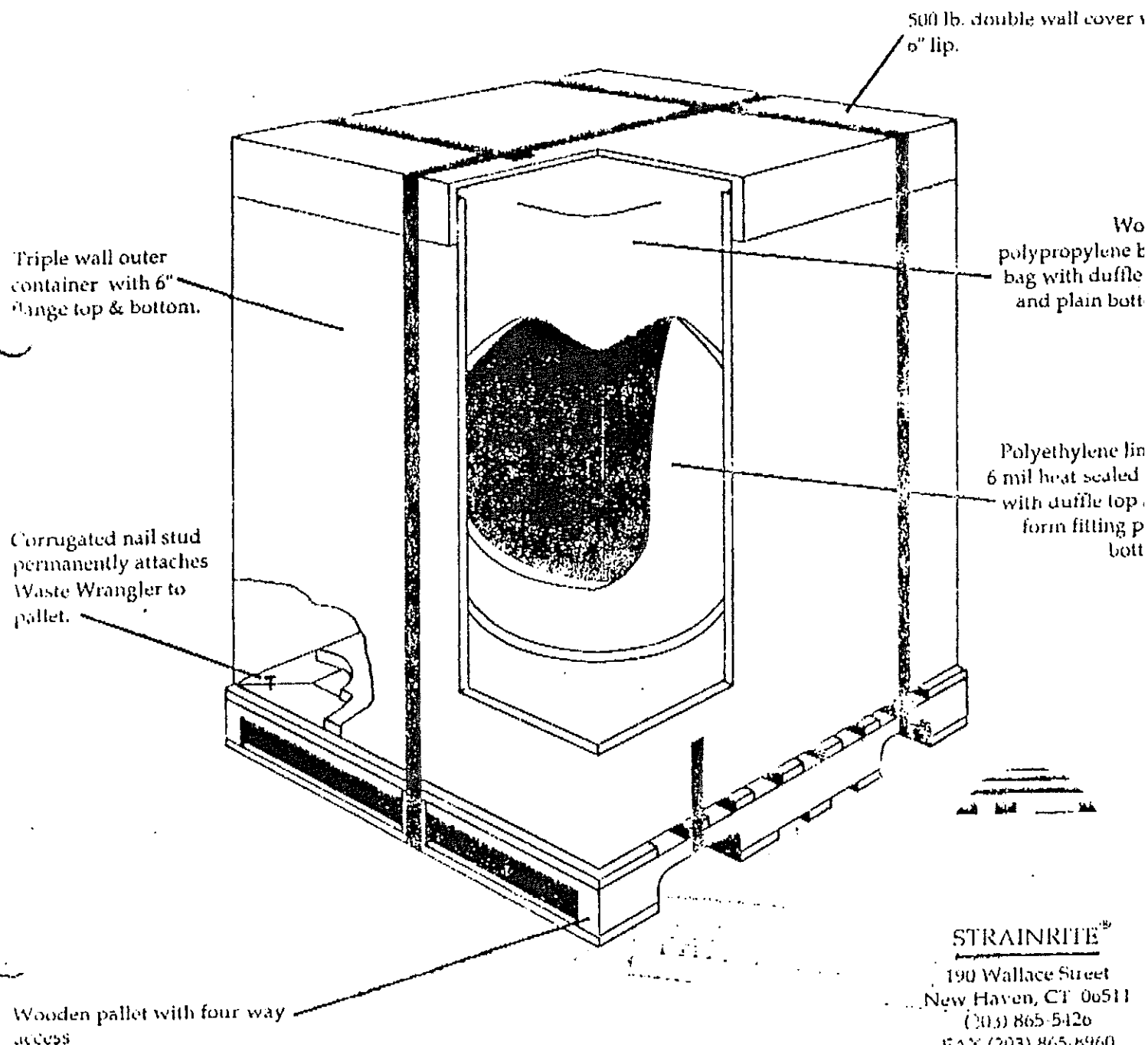
BAGGERS

The Source.

for all your waste storage/transport needs.

R O D U C T I N F O R M A T I O

The **WASTE Wrangler** from UF Strainrite is a woven polypropylene bulk bag used with a specially designed polyethylene liner and triple wall container. The Waste Wrangler provides a safe --and economical!-- way to handle, store and transport both hazardous and nonhazardous materials. Just one Waste Wrangler, in fact, holds as much as four conventional 55 gallon drums. That's real economy. Real convenience. Real smart. Shouldn't you be using the Waste Wrangler?



STRAINRITE®

190 Wallace Street
New Haven, CT 06511
(203) 865-5426
FAX (203) 865-8960
TELEX 961012

11.00 Closure Plan and Closure Cost Estimate

11.10 INTRODUCTION

11.11 GENERAL

This plan describes how ETICAM will close its hazardous waste treatment and storage facility in a manner that:

- Minimizes the need for further maintenance and
- Controls, minimizes or eliminates postclosure escape of hazardous waste, hazardous constituents, or waste decomposition products to the ground, or to surface waters or to the atmosphere.

This plan sets forth all of the steps required to be taken by ETICAM to properly and completely close its hazardous waste storage facility. These steps include:

1. - A description of how and when the facility will be partially (if applicable) and ultimately closed.
2. - An estimate of the maximum inventory of wastes in storage at any given time.
3. - A description of the steps needed to decontaminate hazardous waste equipment during closure.
4. - A schedule for final closure.
5. - Certification requirements by an independent registered engineer.

11.00 Closure Plan and Closure Cost Estimate**11.20 HAZARDOUS WASTES STORED AT ETICAM****11.21 DESCRIPTION AND LIST OF WASTES**

ETICAM is a hazardous waste treatment and storage facility located at 2095 Newlands Drive East in Fernley, Nevada.

The facility accepts, stores and treats various materials which are considered to be hazardous wastes as described in its Part B Hazardous Waste Permit.

The facility stores and treats hazardous wastes in tanks and containers. Generally, wastes stored in tanks are aqueous and are processed through the facility's treatment systems. Containerized waste includes liquids, sludges, and residual salts from the evaporation of treated effluent. The following is a general breakdown of the categories of wastes accepted at ETICAM:

<u>Waste Category</u>	<u>Typical EPA Waste Code</u>	<u>Typical EPA Process Code</u>
1) Metal Containing Liquids and Sludges	F006, F008 D004, D005 D006, D007 D008, D009 D010, D011 K061	S01, S02 T01, T04
2) Cyanide Bearing solutions; plating solutions (non-cyanide); Includes precious metal solutions	F007, F009 D002, D003 K062	S01, S02 T01

11.00 Closure Plan and Closure Cost Estimate**11.22 MAXIMUM INVENTORY**

The estimated maximum inventory of hazardous waste in storage/treatment at any given time at ETICAM is as follows:

Tank Inventory:

<u>No. & Volume</u>	<u>Content:</u>	<u>Maximum Inventory:</u>
5- 6600 gal. 22-3168 gal.	acid solutions	102,696 gals.
7-6600 gal. 6-3168 gal.	alkali solutions	65,208 gals.
7-6600 gal. 2-3500 gal 4-7200 gal. 3-2960 gal	process tanks	90,880 gals.
8-6600 gal.	treated effluent	52,800 gals.
6-6600 gal. 6-3168 gal.	cyanide solutions	58,608 gals.
5-8000 gal	sludge receiving	40,000 gals

Container Inventory:

<u>Containers:</u>	<u>Content:</u>	<u>Maximum Inventory:</u>
4,400 drums (55 gal)	Sludges or Salts (evaporation residue)	242,000 gal
30 bins (20 yds)	Sludges (F006)	121,176 gal

Total Inventory at Closure (Max) 773,368 gals.

11.30 CLOSURE SCHEDULE

The following schedule includes anticipated dates when wastes will no longer be accepted, treated or stored at ETICAM, and intervening closure milestone dates which will allow tracking of the progress of closure.

11.00 Closure Plan and Closure Cost Estimate

<u>Closure Event:</u>	<u>Anticipated Completion Date:</u>
1) Waste no longer accepted, stored or treated.	Year 2035 A.D.
2) Notify EPA/NDEP of the Closure Initiation Date.	180 days before date of initiation of closure
3) Final shipment of waste accepted.	Closure initiation date
4) *Decontaminate loading/unloading areas and all floor and tank containment areas subject to spills and test rinse waters.	Within 70 days of closure initiation date
5) *Treat all remaining inventories of waste on site and decontamination wastes.	Within 85 days of closure initiation date
6) *Decontaminate all tanks, piping, pumps, filters.	Within 110 days of closure initiation date
7) *Treat all tank decontamination rinse waters.	Within 120 days of closure initiation date
8) *Ship all containers of sludges and salts, drums of contaminated absorbent and personal protective equipment to permitted off site facilities.	Within 130 days of closure initiation date
9) *Decontaminate storage pads.	
10) Submit closure certifications to EPA/NDEP by owner/operator and a registered professional engineer.	Within 140 days of closure initiation date
11) Invite EPA/NDEP to review closure.	Within 150 days of closure initiation date
12) Closure complete.	Within 180 days of closure initiation date

*All items above marked with an asterisk are closure steps requiring inspection and/or supervision by an independent registered professional engineer.

11.00 Closure Plan and Closure Cost Estimate

11.40 NOTIFICATION OF INTENT TO CLOSE

At least 180 days before the date closure is to begin, ETICAM will notify EPA and the Nevada DEP of the exact date it intends to initiate closure. In the event that amendments are required to the closure plan, said amendments will be submitted to EPA/NDEP along with the aforementioned notification of closure initiation date. If EPA/NDEP does not approve the plan or requires it to be modified, ETICAM will submit a new or modified plan to EPA/NDEP within 30 days of the date of such notification by EPA/NDEP.

11.50 REMOVAL AND/OR TREATMENT OF HAZARDOUS WASTE INVENTORIES

This section of the closure plan will describe how all hazardous waste at the facility will either be shipped off-site to a permitted facility or treated on-site. All of the actions indicated in this section will be completed within 90 days of the closure initiation.

11.51 SHIPMENT OFF-SITE

Following decontamination activities specified in this plan, ETICAM will ship all inventories of hazardous wastes and residues which cannot be treated on-site to permitted off-site facility(ies). This is expected to consist only of salt residues from the evaporator/crystallizer. Said removal of wastes will be completed within 90 days of initiation of closure as indicated in Section 11.50.

11.00 Closure Plan and Closure Cost Estimate

All transporters will possess hazardous waste transporter licenses in Nevada and all intermediate states, and will have obtained an EPA identification number. All off-site facilities utilized will be fully permitted to accept the waste shipped.

11.52 TREATMENT OF REMAINING INVENTORIES

All remaining inventories (including the decontamination wash and rinse waters from the container storage areas and tank cleaning) will be treated on-site through the treatment systems. However, the closure cost estimate is based on off-site disposal of all liquids, sludges, and salts by a third party.

11.60 DECONTAMINATION OF HAZARDOUS WASTE
STORAGE/TREATMENT AREAS

This section of the closure plan will describe how facility equipment and structures used to manage hazardous wastes will be decontaminated.

11.61 TANKS, PUMPS AND PIPING

Once all non-treatable waste has been shipped off-site and all treatable waste has been processed, the empty treatment/storage tanks will be decontaminated one by one. All tank interior surfaces, will be thoroughly washed with a high pressure steam jenny cleaning unit containing a detergent solution.

11.00 Closure Plan and Closure Cost Estimate

All wash water will be pumped to the 6600 gallon main treatment tank for appropriate treatment. Following the washing operation, each tank interior will be rinsed using the high pressure steam jenny unit without detergent. This first rinse will also be pumped to the above tanks for treatment. A second rinse will be performed and a composite sample of the rinse water will be collected for analysis to determine if decontamination is complete. Analytical testing for listed wastes will involve testing for the hazardous constituents for each listed waste previously stored in a particular area being decontaminated (said constituents being identified in the waste analysis plan; particularly for cyanide and metals. Following tank decontamination, the filter presses will be cleaned using the steam jenny unit by applying one detergent wash and two rinses. The second rinse will again be sampled and tested as previously described to insure decontamination is complete. During the tank decontamination procedures, all of the pumps and piping in the facility should have been adequately washed and rinsed. Any pumps and piping not already cleaned will be decontaminated by pumping through a clean water and detergent solution equal to three times the interior capacity of the line to be cleaned. This wash will be followed by two rinses of clean water. All wash and rinse waters from

11.00 Closure Plan and Closure Cost Estimate

the filter presses, pumps, piping, clarifiers and auxiliary equipment decontamination at facility will be pumped to the 6600 gallon main treatment tank for treatment. Following tank pipe decontamination, all tank area secondary containment structures will be cleaned and decontaminated using one wash and one rinse from the high pressure steam jenny unit. It is estimated that 10,000 gallons of wash and rinse water will be generated from the tank, pumps, piping and auxiliary equipment decontamination.

During the last stages of decontamination operations, only the main 6600 gallon treatment tank, one of the clarifiers and intermediate pumps and piping will be operational. Any sludge generated will be containerized directly from the filters for shipment off-site. Final washing and rinsing of the 6600 gallon tank and the filters will be completed with the resultant waters evaporated and the salt residue containerized for off site disposal. It is estimated that 4 drums (220 gal) of sludge will be generated from treatment of all decontamination wash and rinse waters.

11.62 TRUCK UNLOADING AREA DECONTAMINATION

Unloading area decontamination will be carried out in much the same way as tank and containment area decontamination. First, the entire area will be washed

11.00 Closure Plan and Closure Cost Estimate

with the steam jenny until containing a detergent solution. The wash water will be pumped to the 6600 gallon main treatment tank for treatment. Next, the area will be rinsed using the steam jenny unit without detergent. The first rinse will again be pumped to the 6600 gallon treatment tank for treatment. A second rinse will be performed and a sample of the rinse water will be collected for analysis to determine if decontamination is complete. Analytical testing for listed wastes will involve testing for the hazardous constituents for each listed waste which has been unloaded in the area. (Said constituents being identified in the waste analysis plan.)

11.63 Evaporator/Crystallizer & Drum Storage Pad

The pads will be washed down to remove any residue soluble salts. The water will be pumped into the treatment tank, treated and the effluent evaporated. This will amount to 5,000 gallons.

The lined rain water pond soil will be analyzed for metals and also disposed of if contaminated. It is projected that there will be maximum of about 20 cubic yards of sand and soil blown in over time.

All accumulated drums will be shipped off site to an appropriate site.

11.00 Closure Plan and Closure Cost Estimate

11.64 Container Storage Area

The container storage area will hold a maximum of 29 roll off boxes, each with a maximum capacity of 20 cubic yards. One additional mixing station will also hold 20 cubic yards. This is a total maximum of 600 cubic yards.

The boxes, floor and sump will be washed to remove all sludge residues. It is estimated that 250 gallons will be used for each box (7,500 gallons total) and another 2,500 gallons for washing the floor and sumps. This wash water will be pumped to the processing area for final treatment.

This procedure will require three workers for one week based on cleaning five hoppers per day plus one day to wash the floor.

11.65 Sludge Processing Area

The sludge processing area consists of five receiving hoppers (8,000 gallons each), Three dissolution tanks (2,000 gallons each), 5 dryer pelletizing machines, and 2 smaller batch dryers. After the last material is processed, the hoppers, tanks, conveyors, and dryers will be washed to remove all sludge residues. The floor area and sumps will then be washed. All wash water from this operation will be sent off site, since this is the last step in the overall process.

11.00 Closure Plan and Closure Cost Estimate

The last item to be decontaminated in this area is the scrubbers and dust collectors. All residues will be removed and placed in drums. The equipment internals will then be washed to remove the last traces.

A maximum of 10,000 gallons is estimated for this procedure. Three workers will perform this over a one week period.

11.66 PLANT SCRUBBER SYSTEM

The last equipment to be taken out of service will be the plant scrubbing system. There are two small scrubbers and the main building scrubber. The scrubber water will be pumped into containers, and all ducting and scrubber internals will be washed to remove acids or caustic materials. The final step will be an internal inspection and hand removal of any sludges. A final additional wash will be conducted if needed.

The scrubbers hold approximately 600 gallons, and another 1,000 gallons of wash water is anticipated for the final washout. This will generate a total of 1,600 gallons for of site treatment and or disposal.

11.67 PROTECTIVE AND SPILL CLEAN-UP EQUIPMENT

Following the container storage area decontamination, all personnel protective equipment, and spill cleanup equipment which can not be decontaminated after the

11.00 Closure Plan and Closure Cost Estimate

operations specified in Section 11.50 and 11.60 of this plan, will be containerized and shipped to a permitted off-site facility.

11.70 FACILITY STATUS DURING CLOSURE

During the entire closure process, the facility will maintain compliance with US EPA and Nevada DEP hazardous waste regulatory standards.

11.80 CERTIFICATION OF CLOSURE

11.81 CERTIFICATION BY OWNER/OPERATOR

When closure is complete, the owner/operator will submit a signed certification to EPA that the facility has been closed in full accordance with the specifications in the approved closure plan.

11.82 CERTIFICATION BY AN ENGINEER

11.82.1 INSPECTIONS DURING CLOSURE

During the facility closure operations specified in Sections 11.50 and 11.60 of this plan, ETICAM will obtain the services of an independent registered engineer to oversee said operations. The engineer will inspect the hazardous waste inventory removal operation, inventory treatment and the facility decontamination operations to ensure they are carried out in accordance with the approved closure plan.

11.00 Closure Plan and Closure Cost Estimate

11.82.2 CERTIFICATION BY THE ENGINEER

When closure has been completed, the registered engineer indicated in Section 11.82.1 of this plan will submit a written certification to EPA/NDEP that the facility has been closed in accordance with the specifications of this closure plan.

11.90 COST ESTIMATE OF CLOSURE

This section of the closure plan will assess and estimate the anticipated cost for an independent third party to close the hazardous waste treatment storage aspects of ETICAM as delineated in Section 11.50 through 11.80.

11.91 TREATMENT OF REMAINING INVENTORIES

A maximum cost per gallon of treating all remaining hazardous waste inventories off site is \$1.50/gallon including \$0.25/gallon for transportation. The maximum cost for treatment of the more dilute decontamination wash and rinse waters is \$1.10/gallon.

Operation:

Total treatable inventory (from Section 11.22):

<u>a) tanks:</u>	<u>gallons:</u>	
(1) - acid solutions	102,696	
(1) - alkali solutions	65,208	
(1) - cyanide solutions	58,608	
(2) - process tanks	90,880	
(2) - treated effluent	52,800	
(1)	226,512 gal X \$1.50/gal \$ 339,768
(2)	143,680 gal X \$1.10/gal \$ 158,048
Total:	370,192 gallons \$ 497,816

11.00 Closure Plan and Closure Cost Estimateb) Containers:Cubic Yards:

Sludge bins

600

Disposal at \$ 200/cu yd \$ 120,000

Section 11.91 subtotal..... \$ 617,816

11.92 DECONTAMINATION ACTIVITIES11.92.1 TRUCK UNLOADING AREA

1) Labor; 2 workers at 15 hours
each times \$15/hour (includes
salary taxes and fringe
benefits) \$ 450.00

2) Absorbent, 5 bags at \$10.00 50.00

3) Two empty open top drums at
\$25. drum 50.00

4) Disposal of two drums con-
taminated absorbent at \$62.50/
drum 125.00

5) Steam jenny rental including
detergent, \$50/day for 2 days 100.00

6) Lab testing of second rinse
waters 2 samples at \$150/
sample 300.00

7) Treatment of wash and rinse
waters from decontamination
375 gallons x \$1.10/gallon 412.50

Subsection 11.92.1 Subtotal \$ 1,487.50

11.92.2 TANKS, PUMPS, PIPING AND AUXILIARY
EQUIPMENT DECONTAMINATION

1) Labor, 4 workers at 98 hours
each times \$15/hour \$ 5,880.00

2) Steam jenny rental two units
at \$50/day for 12 days 1,200.00

11.00 Closure Plan and Closure Cost Estimate

- 3) Lab testing of second rinse waters: ten samples at \$150/sample 1,500.00
 - 4) Treatment of wash and rinse water from decontamination 30,000 gallons x \$1.10/gallon .. 33,000.00
 - 5) Disposal of wash and rinse waters and any residual treatment sludges and salt residue from final evaporation from last stages of tank decontamination (refer to 11.62)-880 gallons (16 drums) of combined sludge and wash water at \$62.50/drum for transportation and disposal 1,000.00
 - 6) Disposal of three drums contaminated personal protective equipment at \$62.50/drum 187.50
- Subsection 11.92.2 Subtotal \$ 42,767.50

11.92.3 DISPOSAL OF RESIDUE DRUMS & POND DIRT

- 1) Transportation and disposal of 4,400 drums at \$62.50 ea. \$ 275,000.00

11.92.4 CONTAINER STORAGE AREA

- 1) Washwater treatment for 10,000 gallons at \$ 1.10/gal \$ 11,000.00
 - 2) 98 hours for 3 workers at \$ 15/hr 4,410.00
 - 3) 10 samples at \$ 150 1,500.00
- Subsection 11.92.4 subtotal \$ 16,910.00

11.92.5 SLUDGE HANDLING AREA

- 1) Washwater treatment for 10,000 gallons at \$ 1.10/gal \$ 11,000.00
 - 2) 98 hours for 3 workers at \$ 15/hr 4,400.00
 - 3) 10 samples at \$ 150 1,500.00
- Subsection 11.92.5 subtotal \$ 16,910.00

11.00 Closure Plan and Closure Cost Estimate

11.92.6 PLANT SCRUBBER SYSTEM

1) 1,600 gallons of scrubber water and wash water	\$ 1,760.00
2) 40 hours for three workers at \$ 15/hr	1,800.00

Subsection 11.92.6 subtotal	\$ 3,560.00

11.92.7 SUPERVISION AND CERTIFICATION BY REGISTERED
ENGINEER

1) Periodic inspection during closure activities by an inde- pendent engineer, 20 hours x \$65/hour	\$ 1,300.00
2) Preparation of certification of closure, 2 hours at \$65/hour	130.00

Subsection 11.92.7 Subtotal	\$ 1,430.00

11.93 CONTINGENCIES

The sum of costs in Sections 11.91
through 11.92.7 \$ 975,881

A 10% provision is made for contingencies that may
arise during closure operations. Although all
attempts have been made to include all possible
closure costs, this 10% provision has been added
to account for any anticipated contingencies

..... \$ 97,588

11.94 CURRENT ESTIMATED CLOSURE-COST = OCT 1989

The total closure cost is therefore the sum of
costs in Section 11.91 through 11.93 which is

..... \$ 1,073,469

11.00 Closure Plan and Closure Cost Estimate

Each year (i.e., October) ETICAM will adjust the closure cost estimate by recalculating the cost of closure in current dollars, or by using an inflation factor derived from the most recent Implicit Price Deflator for Gross National Product as published by the U.S. Department of Commerce in its "Survey of Current Business", as specified in paragraphs (b)(1) and (2) of 40 CFR 264.142 as follows:.

"(1) The first adjustment is made by multiplying the closure cost estimate by the inflation factor. The result is the adjusted closure cost estimate."

"(2) Subsequent adjustments are made by multiplying the latest adjusted closure cost estimate by the latest inflation factor."

11.100 AMENDMENT OF PLAN

This closure plan and closure cost estimate will be amended from time to time during the active life of the facility whenever changes in operating conditions, permit modifications, anticipated year of closure, or any of the information in this plan substantially changes. Said amendment must be submitted as part of any permit modification submission, or within 60 days of any changes requiring said amendment but not requiring a permit modification.

Blank Trust Agreement

TRUST AGREEMENT

Trust Agreement, the "Agreement", entered into as of _____ by and between ETICAM a Nevada corporation, the "Grantor", and First Interstate Bank, Nevada, incorporated under the laws of the United States (a National Bank) the "Trustee".

Whereas, the Nevada Department of Conservation and Natural Resources, has established certain regulations applicable to the Grantor, requiring that an owner or operator of a hazardous waste management facility shall provide assurance that funds will be available when needed for closure and/or postclosure care of the facility,

Whereas, the Grantor has elected to establish a trust to provide all or part of such financial assurance for the facility identified herein,

Whereas, the Grantor, acting through its duly authorized officers, has selected the Trustee to be the trustee under this agreement, and the Trustee is willing to act as trustee,

Now, therefore, the Grantor and the Trustee agree as follows:

Section 1. Definitions. As used in this Agreement:

(a) The term "Grantor" means the owner or operator who enters into this Agreement and any successors or assigns of the Grantor.

(b) The term "Trustee" means the Trustee who enters into this Agreement and any successor Trustee.

Section 2. Identification of Facilities and Cost Estimates. This agreement pertains to the facility and cost estimate identified on attached Schedule A.

Section 3. Establishment of Fund. The Grantor and the Trustee hereby establish a trust fund, the "Fund", for the benefit of Nevada Department of Conservation and Natural Resources. The Grantor and Trustee intend that no third party have access to the Fund except as herein provided. The fund is established initially as consisting of the property, which is acceptable to the Trustee, described in Schedule B attached hereto. Such property and any other property subsequently transferred to the Trustee is referred to as the Fund, together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by the Trustee, IN TRUST, as hereinafter provided.

The Trustee shall not be responsible nor shall it undertake any responsibility for the amount or adequacy of, nor any duty to collect from the Grantor, any payments necessary to discharge any liabilities of the Grantor established by Nevada Department of Conservation and Natural Resources.

Section 4. Payment for Closure and Post-Closure Care. The Trustee shall make payments from the Fund as the Director of the Nevada Department of Conservation and Natural Resources shall direct, in writing, to provide for the payment of the costs of closure and/or post-closure care of the facility covered by this Agreement. The Trustee shall reimburse the Grantor or other persons as specified by the Director of the Nevada Department of Conservation and Natural Resources shall direct in writing. In addition, the Trustee shall refund to the Grantor such amounts as the Director of the Nevada Department of Conservation and Natural Resources specifies in writing. Upon refund, such funds shall no longer constitute part of the Fund as defined herein.

Section 5. Payments Comprising the Fund. Payments made to the Trustee for the Fund shall consist of cash or securities acceptable to the Trustee.

Section 6. Trustee Management. The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject, however, to the provisions of this Section. In investing, reinvesting, exchanging, selling, and managing the Fund, the Trustee shall discharge his duties with respect to the trust fund solely in the interest of the beneficiary and with the care, skill, prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of a like character and with the aims; except that:

(i) Securities or other obligations of the Grantor, or any other owner or operator of the facilities, or any of their affiliates as defined in the Investment Company Act of 1940, as amended, 15 U.S.C. 80a-2. (a), shall not be acquired or held, unless they are securities or other obligations of the Federal or a State Government;

(ii) The Trustee is authorized to invest the Fund in time or demand deposits of the Trustee, to the extent insured by an agency of the Federal or State government; and

(iii) The Trustee is authorized to hold cash awaiting investment or distribution uninvested for a reasonable time and without liability for payment of interest thereon.

Section 7. Commingling & Investment. The Trustee is expressly authorized in its discretion:

(a) To transfer from time to time any or all of the assets of the Fund to any common, commingled, or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and

(b) To purchase shares in any investment company registered under the Investment Company Act of 1940, 15 U.S.C. 80a.-1 et seq., including one which may be created, managed, underwritten, or to which investment advice is rendered or the shares of which are sold by the Trustee. The Trustee may vote such shares in its discretion.

Section 8. Express Powers of Trustee. Without in any way limiting the power and discretions conferred upon the Trustee by the other provisions of this Agreement or by Law, the Trustee is expressly authorized and empowered:

(a) To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale. No person dealing with the Trustee shall be bound to see to the application of the purchase money or to inquire into the validity or expediency of any such sale or other dispositions;

(b) To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;

(c) To register any securities held in the Fund in its own name or in the name of a nominee and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee of such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the United States Government, or any agency or instrumentality thereof, with a Federal Reserve Bank, but the books and records of the

Trustee shall at all times show that all such securities are part of the fund;

(d) To deposit any cash in the Fund in interest-bearing accounts maintained or saving certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the Federal or State Government; and

(e) To compromise or otherwise adjust all claims in favor of or against the Fund.

Section 9. Taxes and Expenses. All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees for legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and all other proper charges and disbursements of the Trustee shall be paid from the Fund.

Section 10. Annual Valuation. The Trustee shall annually, at least 30 days prior to the anniversary date of establishment of the Fund, furnish to the Grantor and to the appropriate Director of the Nevada Department of Conservation and Natural Resources a statement confirming the value of the Trust. Any securities in the Fund shall be valued at market value as of no more than 60 days prior to the anniversary date of establishment of the Fund. The failure of the Grantor to object in writing to the Trustee within 90 days after the statement has been furnished to the Grantor and the Director of the Nevada Department of Conservation and Natural Resources shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to matters disclosed in the statement.

Section 11. Advice of Counsel. The Trustee may from time to time consult with counsel, who may by counsel to the Grantor, with respect to any question arising as to the construction of this Agreement or any action to be taken hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting upon the advice of counsel.

Section 12. Trustee Compensation. The Trustee shall be entitled to reasonable compensation for its services as agreed upon in writing from time to time with the Grantor.

Section 13. *Successor Trustee.* The Trustee may resign or the Grantor may replace the Trustee, but such resignation or replacement shall not be effective until the Grantor has appointed a successor trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. Upon the successor trustee's acceptance of the appointment, the Trustee shall assign, transfer, and pay over to the successor trustee the funds and properties then constituting the Fund. If for any reason the Grantor cannot or does not act in the event of the resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall specify the date on which it assumes administration of the trust in a writing sent to the Grantor, the Director of the Nevada Department of Conservation and Natural Resources, and the present Trustee by certified mail 10 days before such change becomes effective. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this Section shall be paid as provided in Section 9.

Section 14. *Instruction to the Trustee.* All orders, requests, and instructions by the Grantor to the Trustee shall be in writing, signed by such persons as are designated in the attached Exhibit A or such other designees as the Grantor may designate by amendment to Exhibit A. The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests and instructions. All orders, requests, and instructions by the Director of the Nevada Department of Conservation and Natural Resources to the Trustee shall be in writing, signed by the Director of the Nevada Department of Conservation and Natural Resources or his/her designees, and the Trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the Grantor or Nevada Department of Conservation and Natural Resources hereunder has occurred. The Trustee shall have no duty to act in the absence of such orders, requests, and instructions from the Grantor and/or Nevada Department of Conservation and Natural Resources, except as provided for herein.

Section 15. Notice of Nonpayment. The Trustee shall notify the Grantor and the appropriate Director of the Nevada Department of Conservation and Natural Resources by certified mail within 10 days following the expiration of the 30-day period after the anniversary of the establishment of the Trust, if no payment is received from the Grantor during that period. After the pay-in period is completed, the Trustee shall not be required to send a notice of nonpayment.

Section 16. Amendment of Agreement. This agreement may be amended by an instrument in writing executed by the Grantor, the Trustee, and the Director of the Nevada Department of Conservation and Natural Resources, or by the Trustee and the Director of the Nevada Department of Conservation and Natural Resources if the Grantor ceases to exist.

Section 17. Irrevocability and Termination. Subject to the right of the parties to amend this Agreement as provided in Section 16, this Trust shall be irrevocable and shall continue until terminated at the written agreement of the Grantor, the Trustee, and the Director of the Nevada Department of Conservation and Natural Resources, or by the Trustee and the Director of the Nevada Department of Conservation and Natural Resources, if the Grantor ceases to exist. Upon termination of the Trust, all remaining trust property, less final trust administration expenses, shall be delivered to the Grantor.

Section 18. Immunity and Indemnification. The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this Trust, or in carrying out any directions by the Grantor or the Director of the Nevada Department of Conservation and Natural Resources, issued in accordance with this Agreement. The Trustee shall be indemnified and saved harmless by the Grantor or from the Trust Fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the Grantor fails to provide such defense.

Section 19. Choice of Law. This Agreement shall be administered, construed, and enforced according to the laws of the State of Nevada.

Section 20. Interpretation. As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each Section of the Agreement shall not affect the interpretation of the legal efficacy of this Agreement.

In Witness Whereof the parties have caused this agreement to be executed by their respective officers duly authorized and their corporate seals to be hereunto affixed and attested as part of the date first above written: The parties below certify that the wording of this agreement is identical to the wording specified in 40 CFR 264.151(a)(1) as such regulations were constituted on the date first above written.

Signature of ETICAM, Officer (Grantor)

(Title)

Attest:

Signature of Trustee

(Title)

Attest:

State of Nevada _____

County of _____

On this _____ day of _____, before me
personally came _____ to me known, who,
being by me duly sworn, did depose and say that he resides
at

that he is _____ of ETICAM the corporation
described in and which executed the above instrument;
that he knows the seal of said corporation; that the seal
affixed to such instrument is such corporate seal; that
is was so affixed by order of the Board of Directors of
said corporation, and that he signed his name thereto by
like order.

Signature of Notary Public

My Commission Expires On: _____

EXHIBIT A

Persons at ETICAM designated to issue orders, requests
and instructions to the Trustee in accordance with
Section 14. Instructions to the Trustee, of the Trust
Agreement dated _____.

Name

Title

Date

SCHEDULE A

OWNER/OPERATOR: ETICAM

LOCATION: FERNLEY, NEVADA

EPA ID Number: NVD 980 895 338

Current Closure Cost Estimate: \$

Post Closure Cost Estimate: Not Applicable

SCHEDULE B

This is to certify that as of the date indicated below, a total of \$ _____ has been deposited in the Trust Fund estanblished at the First Interstate Bank of Nevada, N.A. referenced by the documents attached hereto.

Signature

Date

Owner/Operator: ETICAM
Fernley, Nevada

EPA ID Number: NVD 980 895 338

2.00

FACILITY DESCRIPTION

ETICAM
Fernley, Nevada

2.10 GENERAL

ETICAM (proposes to locate) operates a metals reclamation facility, and a hazardous waste storage and treatment facility in Fernley, Nevada. ETICAM is committed to resource conservation, metals recovery, and proper handling and processing of hazardous waste. This facility performs a unique service in its resource recovery operations. Certain of its operations extract metals from materials and solutions, some of which would otherwise be of no economic value.

2.20 WASTE LISTING

As preciously discussed, ETICAM (desires to) accepts and processes certain materials typically generated by the metal finishing industry. The facility will accept various precious metal and non-precious metal(s) containing solutions including cyanide and acid/alkali solutions (generally plating and stripping baths), and metal bearing solutions and sludges. The metal bearing solutions and sludges, and the cyanide acid/alkali solutions will be stored and processed and valuable metals, if present, reclaimed.

DEFINITION OF CONTAINER 40CFR 260.10:

"Container" means any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

Types of Containers: 40CFR Part 262, Appendix, Table I

DM = Metal drums, barrels, kegs
DW = Wooden drums, barrels, kegs
DF = Fiberboard or plastic drums, barrels, kegs
TP = Tanks portable
TT = Cargo tanks (tank trucks)
TC = Tank cars
DT = Dump truck
CY = Cylinders
CM = Metal boxes, cartons, cases (including roll-offs)
CW = Wooden boxes, cartons, cases
CF = Fiber or plastic boxes, cartons, cases
BA = Burlap, cloth, paper or plastic bags

The Following is a breakdown of the above mentioned materials that ETICAM will accept:

<u>MATERIAL</u>	<u>Typical EPA NO.</u>	<u>Container Type</u>
1) Metal Solutions or Sludges	F006,F008, F019,D006, D007,D008, D011,D004, D005,D009, D010,K061 K062	(tote and bulk) all DOT approved or acceptable
2) Acids/Alkalis (includes precious metal solutions)	D002,D006, D007,D008, D011,D004, D005,D009, D010,K062	(tote and bulk) all DOT approved or acceptable
3) Cyanides (Includes precious metal solutions)	F007,F008 F009,F011, F012,D003, D006,D007, D008,D011, D004,D005, D009,D010,	(tote and bulk) all DOT approved or acceptable

2.21 SUPPLEMENTAL INFORMATION FOR ADDITIONAL WASTE CODES

Table 2.1 is revised to include the following additional waste codes:

1. D codes

The following metal codes have been added;

	EPTOX Level, mg/l
Arsenic (D004)	5.0
Barium (D005)	100.0
Mercury (D009)	0.2
Selenium (D010)	1.0

These metals are occasionally present in small concentrations. ETICAM does not plan to recover these metals, however desires to treat other metal bearing wastes which may be contaminated with traces of these metals.

ETICAM proposes to limit the concentration of incoming waste to 10 times the EPTOX limit for wastes destined for reclamation. Wastes which are destined for landfill after stabilization will have no limit provided that the treatability study demonstrates that the resultant waste meets the applicable treatment standards.

2. K Codes K061 & K062

These codes are for metal containing dusts and acids from the iron and steel industry. K062 is spent pickle liquor which is identical to many metal finishing wastes currently treated from the plating industry.

Generally these pickle liquors are generated in massive quantities and are treated by the generators. ETICAM would receive relatively small quantities from a number of smaller specialty metal finishing shops where their waste happens to fall under the K062 code rather than the traditional D codes. Many of these streams contain various metal components from specialty steels such as stainless and other specialty alloys.

2.30 CHEMICAL/PHYSICAL CHARACTERISTICS OF MATERIALS

Table 2.1 provides a detailed description of the chemical and physical properties of each of the compounds listed in subsection 2.20. Although these properties are provided for the virgin material, they provide useful indications of the properties of the wastes.

The material indicated as metal in Section 2.20 are typically generated by industries throughout the area. ETICAM attempts to reclaim valuable metals from these materials whenever possible. These solutions and sludges often contain significant amounts of copper, nickel, silver, gold, etc. In performing this reclaiming operation, ETICAM is meeting the intent of RCRA by taking a material which would otherwise have to be landfilled, and converting it to a reusable material. At ETICAM, these, otherwise potentially toxic solutions and sludges, are processed to extract any recoverable metals and/or properly treated; thereby decreasing the amount of material being sent to a landfill and reducing the potential for environmental pollution.

TABLE 2.1: Aqueous Wastes - Hazardous Properties

Cyanide Solutions and Sludges

Hazardous Properties: Contains cyanides
 Contains heavy metals
 Generally corrosive
 pH > 12

Specific Characteristics of typical material by EPA waste type:

<u>EPA Waste Type</u>	<u>Specific Gravity</u>	<u>Generic Type</u>	<u>Hazardous Properties</u>
F007	1 - 1.2	Copper/Zinc Baths	CuCN - 28 to 55 gms/Lt Zn(CN) ₂ - 9.5 to 32 gms/Lt NaCN - 60 to 95 gms/Lt pH 10.3 - 10.7
	1 - 1.2	Copper Baths	CuCN - 11 to 126 gms/Lt NaCN - 36 to 142 gms/Lt pH > 12
	1 - 1.2	Cadmium Baths	Cd(CN) ₂ 40 gms/Lt NaCN 80 gms/Lt NaOH 20 gms/Lt
	1 - 1.2	Gold Baths	KCN 11 to 16 gms/Lt
	1 - 1.2	Silver Baths	AgCN up to 111 gms/Lt KCN up to 120 gms/Lt
	1 - 1.2	Tin/Zinc Baths	Zn(CN) ₂ up to 28 gms/Lt KCN up to 20 gms/Lt KOH up to 63 gms/Lt
F008	1 - 1.2	Tank Sludges	Hazardous properties CuCN Zn(CN) ₂ Cd(CN) ₂ Ag(CN) NaCN KCN NaOH KOH

<u>EPA Waste Type</u>	<u>Specific Gravity</u>	<u>Generic Type</u>	<u>Hazardous Properties</u>
F009	1 - 1.2	Cyanide de-plating and cleaning solutions	NaCN up to 100 g/L NaOH up to 30g/L Heavy metal to stoichiometric saturation
F011	1 - 1.2	Spent Quenching Solutions	See F008
F012	1 - 1.2	Quenching Sludges	See F009
D003	1 - 2.0	Cyanide bearing wastes not listed above which, when exposed to pH conditions between 2 and 12.5, can generate toxic gas vapors or fumes in a quantity sufficient to present danger to human health or the environment.	
D006		Same as D003, but also containing Cadmium in excess of 1 ppm.	
D007		Same as D003, but also containing chrome excess of 5 ppm.	
D008		Same as D003, but also containing lead in excess of 5 ppm.	
D011		Same as D003, but also containing silver in excess of 5 ppm.	

Acid and Alkaline Solutions

Hazardous properties: Contains heavy metals
 Generally corrosive
 pH \geq 12

Specific Characteristics of Typical Materials

<u>EPA Waste Type</u>	<u>Specific Gravity</u>	<u>Generic Type</u>	<u>Hazardous Properties</u>
D002	1 - 1.2	Spent Acids Spent Alkalines	Aqueous wastes which have pH less than or equal to 2 or greater than or equal to 12.5

<u>EPA Waste Type</u>	<u>Specific Gravity</u>	<u>Generic Type</u>	<u>Hazardous Properties</u>
D007	1 - 1.2	Chromic Acids Chromates Chrome Plating Baths	Same as D002, but with chromium in excess of 5 ppm.
D008	1 - 1.2	Lead/Tin Alloy Baths Lead Fluoborat Baths	Same as D002, but with lead in excess of 5 ppm
D006	1 - 1.2	Cadmium Fluoroborates	Same as D002, but with Cadmium in excess of 1 ppm
D011	1 - 1.2	Silver Nitrates	Same as D002, but with silver in excess of 5 ppm

Metal Solutions and Sludges

Hazardous Properties: Contains heavy metals
 Generally not corrosive,
 but may be.

Specific Characteristics of Typical Materials by EPA Waste Type

<u>EPA Waste Type</u>	<u>Specific Gravity</u>	<u>Generic Type</u>	<u>Hazardous Properties</u>
F006	1.0 - 2.0	Waste Water Sludges	Up to 30% heavy metals by weight
D006	1.0 - 2.0	Cadmium Sludges and solids	Cadmium in excess of 1 ppm
D007	1.0 - 2.0	Chromium Sludges and solids	Chromium in excess of 5 ppm
D008	1.0 - 2.0	Lead Sludges or solids	Lead in excess of 5 ppm
D011	1.0 - 2.0	Silver Sludges and solids	Silver in excess of 5 ppm

EPA
Hazardous
Waste
Number

Contaminant

Hazardous
Properties

D004	Arsenic	in excess of 5.0 ppm
D005	Barium	in excess of 100.0 ppm
D009	Mercury	in excess of 0.2 ppm
D010	Selenium	in excess of 1.0 ppm

Industry
and EPA
hazardous
Waste No.

Hazardous Waste

Hazard
Code

K061	Emission control dust/sludge from the primary production of steel in electric furnaces.	(T) EP Toxic
K062	Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332)	(C,T) Corrosive EP Toxic

2.31 METHODS OF WASTE GENERATION

The methods of generation of the wastes listed in Section 2.20 and in Table 2.1 are varied.

The metal solutions and sludges to be accepted at ETICAM are generally generated from various metal finishing operations or as industrial wastewater treatment sludges from electroplating, electroless plating and other industrial processes where heavy metals must be removed from aqueous streams prior to discharge to a municipal sewer system or to a waterway. Metal solutions and sludges can also

result from the clean out of metal plating and stripping baths and rinse tanks or from any other process where such materials can be and are generated. Such metal solutions and sludges would include but not be limited to:

- Silver, gold and other precious metals containing solutions and sludge from electroplating, metal stripping, ion exchange, etc. processes.
- Metal solutions and sludges containing nickel, copper, chromium, lead, cadmium, zinc, gold, silver, etc. from various plating, metal cleaning, grinding, polishing and related operations.

The Cyanide and acid/alkali solutions are generally from various metal finishing operations. They usually are plating and stripping bath solutions and rinsewaters. These solutions can contain precious and valuable metal which can be removed from solution.

2.40 STORAGE/TREATMENT PROCESS

This section will describe how materials are **unloaded**, stored and treated at ETICAM.

Tank trucks **transporting liquid hazardous wastes** enter(ing) the (property transporting hazardous wastes into the) unloading bays. (See site plan). The driveway **leading to the building** is bermed on each side with a six inch concrete curb. The **entrance** drive is

(also) sloped towards a rainwater drain which enters a double wall collection tank. (the unloading bays where drainage grates convey any spills directly into storage tanks S-6.)

Quarantined portable tanks and tank trucks will be set on the entrance driveway or on the storage area, which are controlled and contained areas. Note: The portable tanks and tank trucks are DOT approved containers for the transportation of hazardous wastes and have a low potential for leaks and spills, especially when not in transport or when used for fixed storage.

The unloading bay (see facility plan) has bermed sides and sloped floors so that any spillage drains through grates and (spills) flows directly into storage tanks (S-6) B/CN-17 (S-11.0) for Cyanide or A-38 (S-11.1) for Acid/Alkali.

(Vehicles and totes entering the premises) Tanks and containers will remain closed until they enter the unloading bay for sampling (and emptying).

Except as noted in section 2.41, (Totes) Portable tanks will remain on the vehicles until empty, thus (preventing) minimizing the possibility of a rupture or leak resulting from handling. Both trucks and (totes) portable tanks are immediately rinsed and emptied upon acceptance of material so that no more than .3 percent by weight of the total capacity of the container remains in the container. These containers are therefore considered

empty according to 40 CFR 261.7 and are not subject to regulation under Parts 261 through 265 or Part 270 or 124 of this chapter.

Metal bearing sludges are shipped in various types of trucks and/or, containers including but not limited to dump trucks, roll-off containers, boxes, metal drums, plastic drums, metal boxes, wooden boxes, plastic boxes, cloth or plastic bags. These containers are designed for safe handling and are unloaded from the trailer truck directly into the plant for storage and processing.

Since these materials can not be pumped into storage tanks and are sludges rather than free flowing liquids, they will be introduced into the middle of the treatment process; loaded into a reactor for further treatment and filtration, or directly into the dryers for final blending and processing.

2.41 METAL SOLUTIONS AND SLUDGES (HYDROXIDES)

Metal bearing solutions and sludges are to be accepted at ETICAM in (totes and bulk) tank trucks, railroad cars, or containers. These materials originate from various operations such as jewelry manufacturing, circuit board manufacturing, metal finishing and others which generate metal containing solutions and sludges.

Storage of (this material) liquid waste at ETICAM will be in tanks as shown on Site Plan C in Section 14.00. Incoming bulk shipments and (totes) containers will be off loaded into storage tanks (S-1 through S-28), or directly

to the reactors for treatment.

Portable tanks may be removed from the truck and unloaded on the East loading dock or unloading bay when special conditions prohibit mixing in the storage tanks; for instance, small volumes of precious metal bearing wastewater, or where treatment requires segregation.

Treatment of metal solutions and sludges at ETICAM will follow the schematic shown in the process flow diagram in Section 14. Certain of the solutions and sludges accepted at ETICAM have sufficient precious and/or valuable metal content to make reclamation economically viable. Once on-site, laboratory testing will confirm whether or not metals can be reclaimed from the material. If metals can be reclaimed, the material will be processed by either direct filtration or chemical and electrolytic processing. If the solution(s) or sludge does not contain sufficient amounts of precious or valuable metal to make recovery feasible, it will be processed through the treatment system for removal of heavy metal residues. The separated sludge will be shipped off-site to a permitted facility (if hazardous by testing) or to a smelter or other reclamation process. (if metal content warrants.) The separated water phase will be discharged to the public sewer only if all sewer ordinance parameters are met, or evaporated in the evaporator/crystallizer system.

2.42 CYANIDE BEARING WASTES

Cyanide bearing wastes will be stored in holding tanks

(S-1) B/CN-1 thru (S-2) B/CN-6. This waste will then be treated by conventional alkaline chlorination as shown in the process flow diagram in Section 14.00. Cyanide solutions (containing sufficient quantities of precious metals) will be (first) stored in tanks (S-12) B/CN-17 thru (S-13) B/CN-28 and then processed by chemical and electrolytic methods. The resultant barren solutions will then be processed through the facility's proposed treatment system.

In this process the acids and alkalies will be neutralized and any heavy metal residues removed as a metal hydroxide sludge.

The clarified effluent will be discharged to the public sewer system only if all sewer ordinance parameters are met, or evaporated in the evaporator/crystallizer system.

2.43 ACID/ALKALI BEARING WASTES

Acid/alkali bearing wastes will be stored in holding tanks (S-3) B-7 thru (S-6) B-12 for alkalies, (S-7) A-13 thru (S-10) A-16 for acids, and (S-16) A-30 thru (S-28) A-50 for (chelated) acid wastes. These wastes will then be treated by neutralization and heavy metal precipitation as shown in the process flow diagram in Section 14.00. Acid/alkali solutions containing sufficient quantities of metals will be first stored in tanks (S-16) A-30 thru (S-28) A-50 for acids and tanks (S-12) B/CN-23 and (S-13)

B/CN-28 for alkali and then processed by chemical and electrolytic methods. The resultant solutions will then be processed through the facility's proposed treatment system.

In this process the acids and alkalies will be neutralized and any heavy metal residues removed as a metal hydroxide sludge.

The clarified effluent will be discharged to the public sewer system only if all sewer ordinance parameters are met, or evaporated in the evaporator/crystallizer system.

2.50 PROCESS DESIGN CAPACITIES

All processes at ETICAM are shown on the process flow diagrams in Section 14.00. Because most of the operations carried out at the facility are batch treatment operations, it is difficult to accurately predict the design capacities of the operations. Processing time will vary depending on the concentrations of contaminants in the wastewaters being treated, and other factors. The following table gives annual maximum quantities of waste which will be processed at ETICAM:

Metal bearing solutions	31,000 tons/yr
Cyanide bearing solutions	31,000 tons/yr
Acid/Alkali solution	31,000 tons/yr
Metal hydroxide sludges	31,000 tons/yr

2.60 DESCRIPTION OF TREATMENT PROCESS

The treatment system (proposed to be installed will be)

is capable of properly treating all incoming waste acid/alkali, cyanide, spillage and metal bearing solutions.

In addition, the system (will) treats all residual solutions generated from metals recovery operations, and

any contaminated supernatant and filtrate from metal hydroxide sludge processing, or scrubber blowdown. A

complete process flow diagram is provided in Section 14.

This diagram shows all tanks, pumps and auxiliary

equipment to be installed. In addition to the flow

diagram, a listing of all proposed equipment is provided

in Appendix G. Section 8 of this application,

specifically Tables 8.2 and 8.3, provide lists, capacities and descriptions of all proposed tanks.

The following sections describe typical treatment methods used for most waste streams. ETICAM utilizes many proprietary treatment techniques which will change daily as needed to properly handle the variable wastes received.

New treatment protocols will be reviewed by a plant technical committee made up of chemists and engineers to evaluate the efficiency and safety of the process. A step by step treatment protocol for each type of treatment is given to the plant operators.

2.61 ACID/ALKALI SOLUTIONS

Acid/alkali solutions are pumped to batch treatment

Tanks T-1 thru T-6 for processing. Whenever possible,

a waste acid is partially used to neutralize a waste alkali and vice versa.

(Approximately 6600) Between 2500 to 6000 gallons are treated per batch. Depending on the resultant pH of the mixture, lime, (sodium hydroxide) caustic or (hydrochloric) acid are added until a pH of approximately 9 is attained. This pH provides for optimal heavy metal precipitation. (as hydroxides) The contents of the treatment tank are (then) usually mixed for 30 minutes after which the pH is again adjusted if required. pH monitoring is by means of an in-tank pH probe or portable back up meter. Following this pH readjustment, the contents of the tank is pumped to one of two clarification tanks (C-1 and C-2) (C-1 thru C-4) for sludge separation.

(Two) Several additional (optional) procedures (also allowed for these are:) maybe used. These include but are not limited to:

- 1) Sulfide precipitation
- 2) Sodium Borohydride reduction
- 3) DTC precipitation
- 4) Oxidation with peroxide bleach or ozone.
- 5) Thermal decomposition with or without a catalyst.

The following descriptions are typical treatment steps that will vary based on the individual waste stream

being processed. New management technologies and treatment methods will be implemented as a class 1 modification with prior approval from NDEP.

In the case of sodium sulfide precipitation, Na_2S is added dry or in slurry form (20% solution) at a pH of 7 or greater, until all residual metals are precipitated.

In the case of NaBH_4 , or DTC the solution is adjusted to a pH of 6.0. NaHSO_3 is then added in a ration of 1:2 with the total heavy metal present.

The solution is then agitated for 15 minutes and the pH readjusted to 6.5. A 1.2% solution of NaBH_4 is then added until a reduction potential of -4000 MV is achieved for a period of 15 minutes under agitation.

Redox monitoring is by means of an in-tank Redox probe or portable backup meters. Following this pH readjustment, the contents of the tank are pumped to one of (two) four clarification tanks (C-1 and C-2) (C-1 thru C-4) for sludge separation.

2.62 METAL BEARING SOLUTIONS

The following descriptions are typical treatment steps that will vary based on the individual waste stream being processed.

2.62.1 UNRECOVERED METAL BEARING SOLUTIONS

Non-cyanide solutions containing concentrations of dissolved heavy metals which have not been recovered will be processed by the procedure described in Section 2.61 for acid/alkali solutions. (The only)

An exception(s will be for) solutions containing complexing agents or hexavalent chrome.

2.62.2 SOLUTIONS CONTAINING HEXAVALENT CHROME

Solutions containing hexavalent chrome must be pretreated prior to its removal as chromium hydroxide. Because of this, hexavalent chrome bearing solutions are stored in tanks (S-9 and S-10) A-15 and A-16 and pretreated separately from normal acid/alkali or metal bearing wastes.

When a sufficient quantity of hexavalent chrome bearing waste is accumulated, it is pumped to treatment Tanks T-1 (or T-2) thru T-6. If the pH of the mixture is high, it is reduced to 2.5 by the addition of (hydrochloric) acid. pH monitoring is made using an in-tank pH probe or portable back-up meter.

After a pH of 2.5 is attained, sodium metabisulfide (solution) is added. Na_2HSO_3 (Chloride) is a reducing agent which converts hexavalent chrome to its trivalent state. During the NaHSO_3 (solution) addition, (hydrochloric) acid is added as required

to maintain the pH at 2.5 or below. At this pH, conversion of hexavalent to trivalent chrome is most rapid.

Reaction progress is monitored using a hexavalent chrome indicator reagent (diphenyl carbacid). When all hexavalent chrome has been reduced, treatment will proceed as described in Section 2.61 for acid/alkali solutions.

2.62.3 SOLUTIONS CONTAINING MIXTURES AND/OR COMPLEXING AGENTS

Complexing agents such as ammonia can tie up metals in solution and render normal hydroxide precipitation ineffective. Also in this category are spillage wastes from electroplating shops which contain mixtures of various metals.

These wastes are stored and treated separately in order to achieve maximum heavy metals removal. Procedures for treating these solutions is described in this Section. Generally, laboratory treatability tests are conducted on these types of wastes to determine exact treatment procedures.

A. Solutions Containing Nitrite

Solutions containing nitrites (generally neutral or alkaline) are pumped to a treatment tank and agitated. Solid amidosulfuric acid is then added and will be dissolved in the

agitated waste water. The amount of amido-sulfuric acid is then added and will be dissolved in the agitated waste water. The amount of amidosulfuric acid is determined in the laboratory during trial tests.

Following this procedure, (hydrochloric) acid is added slowly until the pH value is adjusted to about 4 - 5. Control is attained by means of a pH measuring probe. This procedure insures that no nitric oxides are formed. The solution is then agitated for about 15 minutes, and the pH raised to 9 with the addition of lime or sodium hydroxide solution.

The resultant mixture is again agitated for about 15 minutes and the pH readjusted to 9, if necessary. The contents of Tanks T-1 (or T-2) thru T-6 is then pumped to the clarification Tanks (C-1 or C-2) C-1 thru C-4 for sludge removal.

B. Solutions Containing The Complexing Agents
Nitrilo Triacetic Acid, Ethylene Diamino
Tetraacetic Acid, Hydroxilated Hydrocarbon
Compounds and Ammoniacal Compounds

The solution is pumped to treatment Tanks T-1 (or T-2) thru T-6 and the pH adjusted to a value of 3 - 4. NaHSO_3 solution is then added to mixture while it is agitated. The amount of Na_2HSO_3 is determined by laboratory bench

tests. Sodium Sulfide and lime are then added until the mixture pH raises to 12. The solution is then agitated for one hour.

The sludge generated from this treatment is produced separately through one of the clarifiers (C-1 or C-2) (C-1 thru C-4).

C. Solutions Containing The Complexing Agents Including Organic Amino Compounds

The solution is pumped to treatment Tanks T-1 (or T-2) thru T-6 and the pH adjusted to between 7 - 12. Sodium sulfide is then added while the mixture is agitated. The exact amount of sodium sulfide is determined by laboratory trial tests.

Following a 20 minute agitation, lime or (hydrochloric) acid is added until a pH of 9 is attained. The solution is again agitated for 30 minutes.

Sludge generated from this treatment step is processed separately through one of the clarifies (C-1 or C-2) (C-1 thru C-4).

2.63 SOLUTIONS CONTAINING CYANIDES

Cyanide bearing solutions are pumped to batch treatment (Tank T-3) T-7 thru T-9 for processing.

With the mixer on, sodium hydroxide solution is added

(if required) until a pH of 11 or above is achieved. pH control is by means of a pH monitoring probe.

Sodium hypochlorite solution (normally 15%) hydrogen peroxide, ozone, or sulfur dioxide is then added to oxidize the cyanide. The pH is maintained at 11 by sodium hydroxide solution addition. Reaction progress is monitored by means of an oxidation/reduction potential monitoring probe, and the use of potassium iodide starch test paper (for excess chlorine indication).

When reagent additions are complete, the solution is allowed to agitate for six hours to ensure oxidation of complexed cyanides. An excess chlorine content is monitored during this period by means of the starch test paper. Additional hypochlorite is added as required.

Following the reaction period, any excess chlorine is removed by the addition of NaHSO_3 solutions. Final pH adjustment to a pH of 9 is made in Tank (T-3) T-1 thru T-9 with the addition of (hydrochloric) acid.

A pH readjustment is made following a 15 minute agitation and the solution pumped to clarifiers C-1 (and C-2) thru C-4 for sludge separation.

Piping, process changes and modifications may be required as technology changes to enhance treat-

ment and recovery. These modifications will be approved under a Class I Modification procedure, with prior approval of the State of Nevada, NDEP.

2.64 SLUDGE PROCESSING

The reaction mixture from the treatment of acid/alkali, cyanide, metal bearing and spillage wastes contains suspended metal hydroxide floc which must be removed from the mixture. (Two) Four clarifiers will be utilized for this purpose (Tanks C-1 (and C-2) thru C-4). The reaction mixture is pumped to one or more of these clarifiers and the floc is allowed to settle for several hours. During this period, the solid particles agglomerate and settle to the bottom of the clarifier to form a sludge.

(Clarified water then flows from the upper section of the clarifier to Tank (T-4) for final purification. The sludge is pumped under pressure through the band filter.)

If the settling process does not produce a sufficient quantity of clarified water, the whole slurry will be pumped (under pressure through the band filter) to the filtration system.

Metal hydroxide solids are separated from the sludge by means of (the band filters) a filtration system. The filtrate is further processed to reduce metal

content as determined by testing. The filtrate resulting from the (filter press) filtering operation is piped (through) to neutralization (Tank T-4) Tanks N-1 & N-2 into the final purification plant pumping Tanks (S-29) (E-1 and E-2).

2.65 FINAL NEUTRALIZATION

The purified wastewater from the clarification and (filter press process) filtration will be pumped to the continuous neutralization (plant) process for pH control. (The pH will be automatically adjusted to 7 - 9.)

If the pH exceeds the limits of the preselected range, an (optical and audible) alarm will be triggered.

The purified and neutralized wastewater, after this step, is now suitable for ion exchange processing, if required, (and) discharge to the public sewer, or evaporation in the evaporator/crystallizer system.

2.66 FINAL POLISHING - ION EXCHANGE

After detoxification, neutralization and filtration, the wastewater may still contain very small residual amounts of metals. For some waste streams these metal traces (will) can be removed by means of ion exchange. The clarified wastewater is transferred to pumping Tanks (S-29) E-1 and E-2 from which it will undergo final polishing.

(The wastewater in Tank S-29 is) Waste water to be treated in the ion exchange will first be pumped through a pressure sand filter filled with quartz. This procedure will protect the ion exchange resins from small mechanical impurities and contact with turbid water. From the pressure filter the wastewater flows through one selective anion exchanger and two selective cation exchangers, connected in series. The concentrations of metals in these exchangers can be checked by means of a reagent that indicates heavy metals.

As soon as the capacity of the anion exchange column is exhausted, it will be disconnected and regenerated. During the regeneration cycle, clarified water will be retained in Tanks (S-29A and S29B) E-1 and E-2.

As soon as the capacity of the first cation exchange column is exhausted, it will be disconnected. During this regeneration, the second column will be operated alone. After regeneration, the first column will be reconnected in such a way that it will become the second ion exchange column in the series. This system will prevent the escape of metal ions into the sewer. The ion exchangers are also able to remove small amounts of heavy metals from effluents with high neutral salt contents.

The regeneration of the anion exchangers is performed

by means of diluted sodium hydroxide. After the sodium hydroxide treatment, the resin will be washed out. The regenerant and wash water will be fed into cyanide waste storage Tank (S-1) B/CN 17. The volume of wastewater per regeneration will amount to 750 gallons per day.

The regeneration of the cation exchanges is performed by means of diluted hydrochloric acid. After the hydrochloric acid treatment, the resin will be washed out, conditioned by means of diluted caustic soda solution, and washed out once more. The regenerant and the wash water will be fed into one of the acid wastewater storage tanks. The volume of wastewater per regeneration will amount to about 800-900 gallons per day.

The maximum flow rate from the final purification plant is limited to about 55 GPM. The flow from the purification plant will be discharged to holding Tanks (S-30, 31 and 32) E-3 thru E-8.

The water in Tanks (S-30 through S-32) E-3 thru E-8 will be discharged to sewer only after it has been sampled and analyzed to confirm compliance with ETICAM's water discharge permit as shown in Appendix I.

2.67 SOLUTIONS CONTAINING VALUABLE METALS

Solutions containing recoverable concentrations of gold, silver, nickel, or copper will be processed for actual removal of the particular metal. This will be accomplished by the chemical treatment and electrolytic deposition of the metal.

Equipment to be provided for electrolytic recovery/ion exchange of these metals will be located in the recovery rooms as shown on Site Plan C. This equipment is specified in listing provided in Appendix G, and basically consists of (separate) electrolytic units for **cadmium, chrome, zinc**, silver, gold, nickel and copper recovery along with all ancillary feed tanks, pumps, ion exchange, etc.

During electrolytic recovery operations, a current is passed through the solution and the metal is electro-deposited onto special cathodes. Once the metal is removed, the barren solution is transferred to the appropriate storage tank for subsequent treatment as previously described.

The recovery capacity of these systems is as follows:

<u>Metal</u>	<u>Form</u>	<u>Metal Capacity Per Shift</u>	<u>Volume Capacity Per Shift</u>
Cadmium	Metallic Sheet	1 Ton	32m ³
Chrome	Metallic Sheet	1 Ton	32m ³
Copper	Metallic Sheet	1 Ton	32m ³
Gold	Saturated Resin	200 T.O.	4m ³
Silver	Metallic Flake	225 T.O.	7m ³
Nickel	Nickel Sulfate (100 gms./lt.)	1 Ton	32m ³
Zinc	Metallic Sheet	1 Ton	32m ³

The maximum flow rate from the final purification plant is limited to about 100 GPM. This plant will not operate continuously.

The flow from the purification plant will be discharged to the continuous flow neutralization plant.

2.71 INCOMING SHIPMENTS

All metal bearing solutions and sludges, cyanides, acid/alkali solutions, and precious metal bearing solutions accepted for storage/treatment by ETICAM will be accompanied by fully completed uniform manifest form **and Land Ban Notification** as required by regulation. The manifest form used will be acceptable to the State of Nevada. ETICAM will not accept the aforementioned materials unless a manifest accompanies the shipment, and ETICAM, has been designated on the

manifest by the generator to receive the material.

When the state of origin does not classify the material as a hazardous waste, a bill of lading will be used in place of the manifest.

Upon acceptance of a shipment, ETICAM will sign and date the manifest to indicate receipt of said shipment. Any significant manifest discrepancies will be noted on the manifest form (refer to subsection 3.10 of the Waste Analysis Plan).

<u>Manifest Copy</u>		<u>Distribution</u>
Destination State Copy 1	-	ETICAM mails to Environmental Office in State of Nevada
Generator State Copy 2	-	ETICAM mails to Environmental Office in State where waste was generated
Generator Completed Copy 3	-	ETICAM mails to Generator
Facility Copy Copy 4	-	ETICAM retains for at least 3 years
Transporter Copy Copy 5	-	Transporter keeps after signing by ETICAM
Destination State Copy 6	-	Already detached when waste received at ETICAM
Generator State Copy 7	-	Already detached when waste received at ETICAM
Generator Copy Copy 8	-	Already detached when waste received at ETICAM

2.72 OUTGOING SHIPMENTS

Any and all wastes generated at ETICAM during precious/valuable metal reclamation or the described treatment/storage operations which must be shipped off-site for disposal will be evaluated and/or tested prior to shipment to determine whether or not they are hazardous. IF they are hazardous, they will be shipped by manifest to fully authorized and permitted off-site treatment, storage or disposal facilities.

This section describes the evaporation system and container storage area currently operating under interim status. Also described is the additional evaporation equipment planned for installation with this permit application.

2.80 EVAPORATOR / CRYSTALLIZER SYSTEM

An evaporator / crystallizer system is used to evaporate treated effluent from the metals recovery process and recover the residual salts in a semi dry form. This system is used as an alternative to discharging treated effluent to the sewer as well as for further processing the effluent to meet the sewer limits. The existing system is capable of evaporating 16,000 gallons per day.

2.81 SYSTEM DESCRIPTION

The existing system consists of a Falling Film evaporator followed by a Spray Crystallizer.

The Falling Film evaporator consists of long vertical tubes jacketed by steam. The liquid is fed into the top and allowed to fall down the tubes as a film. The vaporized effluent and liquid are separated at the bottom in a separator tank; The liquid is recirculated back to the top, and the separated vapor (steam) is sent to the Spray Crystallizer. See figure 2.81

The stream from the Falling Film evaporator provides a heat source and is condensed in the spray crystallizer. This condensate is returned to the facility for reuse or mixed with other effluent water destined for the sewer.

A portion of the water recirculating in the Falling Film Evaporator is pumped to the Spray Crystallizer.

The Spray Crystallizer consists of a Steel tower with a fan and spray nozzle at the top section. Hot recirculating effluent is sprayed at a point below the fan which draws air up through the spray pattern and out the stack section into the atmosphere. Mist eliminator pads are installed below the fan to collect water droplets from being emitted.

See figure 2.82

The evaporation of the water leaves the residual salts in a concentrated form where they crystallize out of solution. The recirculated spray water is collected in a bottom cone shaped tank with a capacity of about 1,000 gallons.

A portion of this recirculating salt slurry is pumped to a centrifuge where the suspended salt crystals are separated. Certain residual salts can not be separated in the centrifuge, and are pumped from the crystallizer as a hot solution. These salt solutions will solidify after cooling. These salts will usually contain a portion of free liquids.

2.82 OPERATING PARAMETERS

There are no restrictions for the metal content entering the evaporation system, since all metal salts are non volatile, and end up in the salt stream. ETICAM will set internal limits for process control to maintain metal concentrations in the residual salts to desired levels. At the time of this writing, the residual salts are classed as hazardous wastes under the derived from rule or potentially as a listed waste from the treatment of electroplating waste waters.

The pH of the effluent is maintained between 5 and 10 to prevent corrosion problems. The exact pH will vary from one waste stream to the next depending on process conditions, and the salt species. For instance, ammonium sulfate salts should be maintained at a lower pH to prevent the release of ammonia gas.

The metal content of the residual salt can be controlled by one of several methods; limiting the metal content in the treated effluent, or by recycling the centrate from the centrifuge back for metal removal in the treatment process.

2.83 HANDLING OF SALTS

Salts separated in the crystallizer system are collected in containers for storage prior to shipping off site. The normal container used is a 55 gallon steel drum, however other types of bags, bins or hoppers can be used depending on

the most economical handling method and site of destination.

The containers are stored on a drum storage pad designed to contain spills and collect rain water. The pad is 100 by 160 feet, and can hold a maximum of 4,400 drums stacked two high and with 2 foot isles for inspections. The drums are placed in rows which are 20 deep, so that removal of a single drum from a row can be accomplished by moving a minimum of drums.

The container area will be inspected a minimum of once per week in accordance with the inspection schedule in section 5.00.

The pad is sloped to a corner sump for pump out. The curbs will contain about 1,500 gallons of liquid. Since 90 percent of the salt or metal product stored on the pad is a solid (no free liquids), there is no risk of the pad overflowing from a spill. Additionally, a rain water collection pond is provided to collect any rainwater which may overflow the pad. All collected rain water is sampled and analyzed to insure there is no metal contamination. Normally the collected rain water will evaporate in the pond, since there is a significant net evaporation rate in Nevada. Collected rain water is pumped back to the plant for treatment if contamination is found to be present.

2.84 FORCED CIRCULATION EVAPORATOR (PROPOSED)

The existing evaporation system was installed as an interim device to handle treated effluent until a larger capacity system can be installed. The Forced Circulation evaporator will be placed in series between the existing Falling Film evaporator and Spray Crystallizer.

This unit will add an additional potential of 8,000 gallons per day of evaporation. The evaporator is of the same dimensions as the spray crystallizer, but without a fan pulling air through the unit. The vaporized effluent will supply steam to the Spray Crystallizer; The Forced Circulation evaporator will in turn receive it's steam from the falling film evaporator. This will essentially convert the evaporator / crystallizer system into a triple effect evaporator. See figure 2.84

There will also be additional condensate returned from this evaporator, which will also be reused in the plant or combined with effluent for discharge to the sewer.

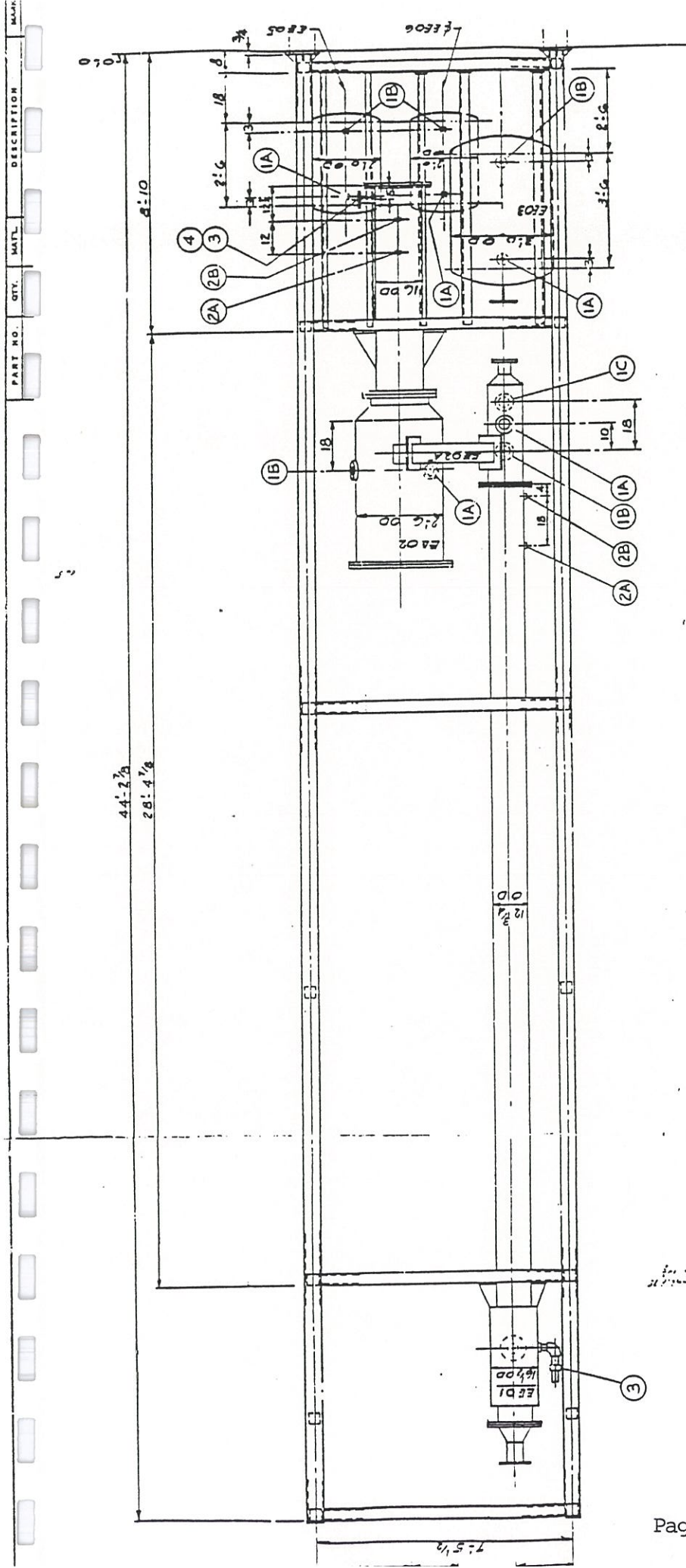
2.85 MULTIPLE EFFECT FLASH EVAPORATOR (PROPOSED)

A separate multiple effect evaporator is planned to provide a nominal evaporation rate of 10 gallons per minute (14,400 gallons per day). This unit will include a cooling tower atmospheric evaporation stage where approximately 2 gallons

per minute of water is evaporated. The remaining water evaporated is recovered as condensate in subsequent stages.

Each stage of the flash evaporator consists of a vacuum chamber where heated water is injected. As the heated water enters the chamber, a portion flashes into steam; thus the name flash evaporator. See figure 2.85

The Flash Evaporator will operate independently from the evaporator crystallizer, and will be used to handle a variety of waste and effluent streams. The unit is designed of corrosion resistant materials, and is capable of evaporating acidic or alkali streams. The waste streams will be segregated and directed to the Falling Film evaporator or this unit as determined by the Process Chemist to separate recoverable salts or metal bearing streams.



ESTIMATED LOADS @ TOP OF FOOTINGS (VESSEL MODULE ONLY)
(FACIL INSTALLATION MUST BE AS-SIGNED TO SUIT)

FIGURE 2.81

Signal Swenson Division 15700 Lathrop Avenue, Harvey, IL 60426 Phone: 312-331-5500 • Telex 25-3274 UOP Inc.		Title: ESE FALLING FILM EVAPORATOR - PILOT PLANT Capacity: For:		U-85194 DRAWER
Reg. 10-8415 Dr. SA Date 3/15/82 Scale: 1/4" = One Ft. Appr. Ruk Appr. Appr.		Title: ESE FALLING FILM EVAPORATOR - PILOT PLANT Capacity: For:		
1	1-13-82			
2	3-2-82			
3	3-26-82			

SEC FOR CARBY SALT - FOOD GRADE NaCl

NOT TO
SCALE

SEP 25, 86

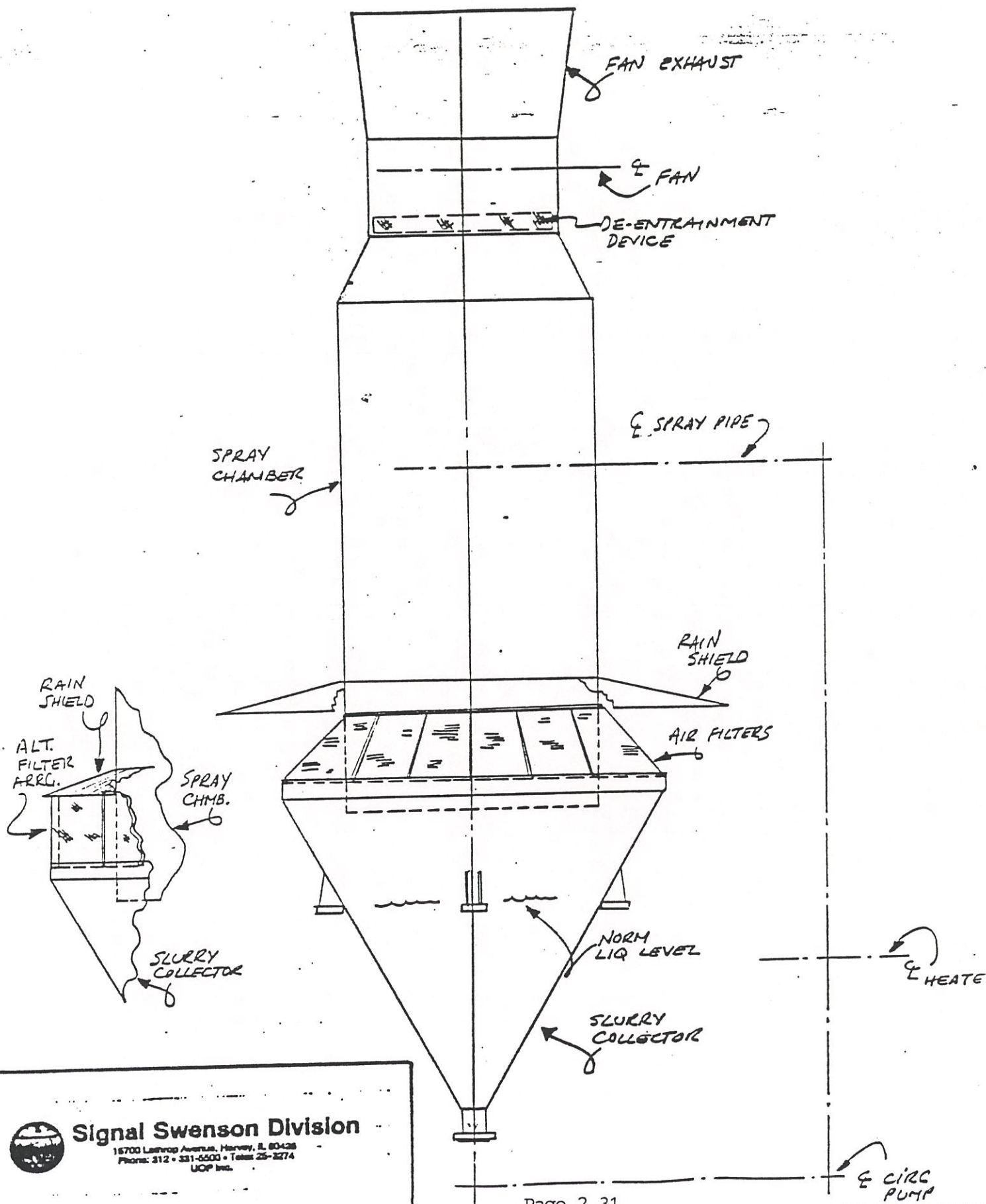
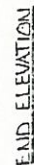
**Signal Swenson Division**15700 Lathrop Avenue, Harvey, IL 60426
Phone: 312 • 331-5500 • Telex 25-2274
UOP Inc.

FIGURE 2.85

ALL FINANCIAL EQUIPMENT AND ACT ONE
TO FACILITATE CLARITY.

PRELIMINARY
NOT FOR CONSTRUCTION

TELEPHONE CONVERSATION
NOT TO BE ON THIS
AND OTHERWISE POSSIBLE



TELEPHONE CONVERSATIONS	
TE-1	LEAVING TOURS SECTION PHONE, LT. SORCIA TALK - 3"
TE-2	COINING COORDINATE RETURN - 10"
TE-4	COINING TOURS RETURN - 3"
TE-6	DISTILLATE SUPPLY - 3/4"
TE-8	CONCENTRATE, REMOVAL - 2"
TE-1	STEAR, 10 - 3"
TE-4	WENT TO COINING TOURS, SOURCE TRAIL - 1/4" (SHORT)
TE-5	1/2" GRASS (NOT KNOWN)
TE-9	3/4" DISTILLATE DRAIN (NOT KNOWN)

[illegible]

[illegible]

PLANT SIZE: 17'-9" LONG
6'-6" WIDE
10'-11" HIGH

ITEMIZED COMPLETIONS

16-1	2 1/2" DIA. HOLE	1/8"
16-2	3" CONCRETE RATION	1/3"
16-3	1" DIA. HOLE	1/4"
16-4	1/2" DIA. HOLE	1/4"
16-5	1/2" DIA. HOLE	1/4"
16-6	1/2" DIA. HOLE	1/4"
16-7	1/2" DIA. HOLE	1/4"
16-8	1/2" DIA. HOLE	1/4"
16-9	1/2" DIA. HOLE	1/4"
16-10	1/2" DIA. HOLE	1/4"
16-11	1/2" DIA. HOLE	1/4"
16-12	1/2" DIA. HOLE	1/4"
16-13	1/2" DIA. HOLE	1/4"
16-14	1/2" DIA. HOLE	1/4"
16-15	1/2" DIA. HOLE	1/4"
16-16	1/2" DIA. HOLE	1/4"
16-17	1/2" DIA. HOLE	1/4"
16-18	1/2" DIA. HOLE	1/4"
16-19	1/2" DIA. HOLE	1/4"
16-20	1/2" DIA. HOLE	1/4"
16-21	1/2" DIA. HOLE	1/4"
16-22	1/2" DIA. HOLE	1/4"
16-23	1/2" DIA. HOLE	1/4"
16-24	1/2" DIA. HOLE	1/4"
16-25	1/2" DIA. HOLE	1/4"
16-26	1/2" DIA. HOLE	1/4"
16-27	1/2" DIA. HOLE	1/4"
16-28	1/2" DIA. HOLE	1/4"
16-29	1/2" DIA. HOLE	1/4"
16-30	1/2" DIA. HOLE	1/4"
16-31	1/2" DIA. HOLE	1/4"
16-32	1/2" DIA. HOLE	1/4"
16-33	1/2" DIA. HOLE	1/4"
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16-41	1/2" DIA. HOLE	1/4"
16-42	1/2" DIA. HOLE	1/4"
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16-44	1/2" DIA. HOLE	1/4"
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16-48	1/2" DIA. HOLE	1/4"
16-49	1/2" DIA. HOLE	1/4"
16-50	1/2" DIA. HOLE	1/4"
16-51	1/2" DIA. HOLE	1/4"
16-52	1/2" DIA. HOLE	1/4"
16-53	1/2" DIA. HOLE	1/4"
16-54	1/2" DIA. HOLE	1/4"
16-55	1/2" DIA. HOLE	1/4"
16-56	1/2" DIA. HOLE	1/4"
16-57	1/2" DIA. HOLE	1/4"
16-58	1/2" DIA. HOLE	1/4"
16-59	1/2" DIA. HOLE	1/4"
16-60	1/2" DIA. HOLE	1/4"
16-61	1/2" DIA. HOLE	1/4"
16-62	1/2" DIA. HOLE	1/4"
16-63	1/2" DIA. HOLE	1/4"
16-64	1/2" DIA. HOLE	1/4"
16-65	1/2" DIA. HOLE	1/4"
16-66	1/2" DIA. HOLE	1/4"
16-67	1/2" DIA. HOLE	1/4"
16-68	1/2" DIA. HOLE	1/4"
16-69	1/2" DIA. HOLE	1/4"
16-70	1/2" DIA. HOLE	1/4"
16-71	1/2" DIA. HOLE	1/4"
16-72	1/2" DIA. HOLE	1/4"
16-73	1/2" DIA. HOLE	1/4"
16-74	1/2" DIA. HOLE	1/4"
16-75	1/2" DIA. HOLE	1/4"
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16-77	1/2" DIA. HOLE	1/4"
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16-79	1/2" DIA. HOLE	1/4"
16-80	1/2" DIA. HOLE	1/4"
16-81	1/2" DIA. HOLE	1/4"
16-82	1/2" DIA. HOLE	1/4"
16-83	1/2" DIA. HOLE	1/4"
16-84	1/2" DIA. HOLE	1/4"
16-85	1/2" DIA. HOLE	1/4"
16-86	1/2" DIA. HOLE	1/4"
16-87	1/2" DIA. HOLE	1/4"
16-88	1/2" DIA. HOLE	1/4"
16-89	1/2" DIA. HOLE	1/4"
16-90	1/2" DIA. HOLE	1/4"
16-91	1/2" DIA. HOLE	1/4"
16-92	1/2" DIA. HOLE	1/4"
16-93	1/2" DIA. HOLE	1/4"
16-94	1/2" DIA. HOLE	1/4"
16-95	1/2" DIA. HOLE	1/4"
16-96	1/2" DIA. HOLE	1/4"
16-97	1/2" DIA. HOLE	1/4"
16-98	1/2" DIA. HOLE	1/4"
16-99	1/2" DIA. HOLE	1/4"
16-100	1/2" DIA. HOLE	1/4"

[illegible]

ETICAM
Fernley, Nevada

This section will describe the efforts, procedures, structures, and equipment used at ETICAM to prevent hazards during material unloading, transfer, and storage operations.

8.10 GENERAL

Special procedures and equipment must be used at regulated treatment/storage facilities to prevent runoff of spills and/or leaks of reclaimable material to the environment, prevent contamination of surface or groundwater supplies, mitigate the effects of equipment failure and power outages, and prevent undue exposure of personnel to hazardous materials. ETICAM has addressed such environmental safeguards to prevent the occurrence of any of the aforementioned situations.

8.20 LOADING/UNLOADING

8.21 GENERAL

Material transfer operations to ETICAM can take place from (one of two) various types of delivery vehicles. Transfer will be effected either by bulk delivery from a truck or from a cargo (box) truck and rail car or from containers (containing

totes) to the storage tanks. The (tote) portable tanks contents are to be pumped (out) to the storage tanks while (the totes are) on the truck. Only empty (totes) portable tanks are to be stored (in) outside of permitted areas (the facility). During unloading operations, spills are unlikely since all unloading is to take place within a contained area; however, in the event of a release to the environment, standard industrial absorbents are located nearby.

The unloading area is designed with a segregated area for cyanide discharge. This area is separately bermed and drained to prevent accidental mixing of reactive products in the event of a spill. (See Plans and Specification, Section 14)

In the event of a manifest discrepancy requiring the quarantine of a shipment as described in Section 3.31, the vehicle with the shipment will be quarantined on the entrance drive or in receiving bays. These bays are designed to address all requirements of 40 CFR Section (115.) 264.175.

Empty (totes) containers will be available to transfer hazardous waste in the event of structural defects or leaks in shipped containers.

(All totes will be kept closed during the quarantine period and will not be removed from the vehicle.)

All (totes) portable tanks will meet DOT specifications. (E-9150.)

8.22 BULK - UNLOADING/LOADING

Wastewater will be delivered to the plant by specialized trucks. For transportation of small volumes, containers (totes) with a capacity of (350) up to 550 gallons will be provided. Larger volumes will be conveyed by tank trucks. (with compartmentalized tanks.) Special containers will be leased to the waste water generators (totes) and will be pumped out to tank trucks when filled. (In order to avoid mixing of the waste waters, the containers will be labeled and color-coded as follows:)

(Red: For acid waste water (also containing chromate)

Blue: For alkaline waste water, free from cyanide

Yellow: For waste water containing cyanide

Green: For spillage and nitrate and complexing agent bearing waste waters.

(Each container discharge pipe shall be equipped with a coupling piece that will be different for each type of waste water listed above. These special coupling pieces can only be fitted into the corresponding coupling pieces of the piping at the treatment plant unloading area. The containers for transportation are consecutively numbered.)

Loading of the trucks will be such that acid and alkaline waste waters will be transported on the same truck and likewise for cyanide waste waters.

It should be pointed out that the unloading station is completely enclosed. Any leakage enters a special drainage system inside the building and is eventually treated. This system eliminates the possibility of wastes leaving the building.

Wastes are gravity fed **or pumped** (upon arrival) to the tanks in the storage area (floor plan - See Site Plan in Section 14.00), **or pumped directly to the reactor.**

Waste streams not requiring treatment may be pumped directly to the sludge tanks (clarifiers), effluent tanks or evaporation system. Transfer will be through permanently installed piping or temporary hoses. When hoses are used, an operator will be present during the transfer process, and hoses will be within spill containment areas.

Wastes are pumped from tanks in the waste storage area to the waste processing or recovery area for treatment.

Special lock-out systems will be used to prevent accidental mixing of the wastes. Each coupling will have a key lock and electrical lock-outs controlled by the shift (chemist) **operator.** To further guard

against accidental mixing of wastes, only responsible and trained personnel will be in charge of tank unloading. These tank unloading personnel will be responsible for checking the wastes and operating the discharge valves. Tanks will be discharged by gravity. Except for special situations as noted in section 2.41, the tanks will stay on trucks and will have fixed discharge hoses. The only time tanks will be removed from trucks is after they have been completely emptied. As mentioned, tanks and associated piping will be labeled and color coded.

Since containers are never moved on or off vehicles when full, no additional equipment beyond what is cited above is required to prevent hazards in unloading process (each truck is in a bermed and sloped unloading area which drains into a 4000 gallon holding tank). Each truck is parked in a bermed and sloped unloading area depending on the type of waste being hauled. The sloped unloading area drains into a 3000 gallon holding spillage tank. (see Site Plans Section 14.00). The unloading area is constructed of concrete and sealed with an epoxy sealant. (It is also bermed, sloped and drained into 4000 gallon tanks S-12 for CN and S-17 for acids and alkalines.) The Cyanide unloading area drains into B/CN-17 (S-11) and the acid/alkaline unloading area drains into A-38

(S-11.1). In this way contamination of the water supply is highly unlikely. Since all safety and unloading equipment are designed for gravity flow, or pumping rather than pressurizing the tank, safety precautions would be unaffected by a power outage or equipment failure.

8.30 STORAGE/TREATMENT AREA PARAMETERS

8.31 GENERAL

All storage areas are within the roofed building and therefore, are not subject to precipitation buildup which would have required special provisions for run-off control. In addition, there will not be accumulation of liquids (precipitation) requiring analysis, even after berm construction. Spills will be handled as described in Section 8.33.

8.32 TANK STORAGE/TREATMENT AREA

8.32.1 STORAGE TANKS

There will be (28) 52 tanks in the storage areas. Each tank will have capacities as shown in Table 8.1. Unloading procedures (to tanks) are outlined in Section 8.22.

The (28) 52 tanks will be situated within (five) seven containment areas (see Site Plan C (floor plan)). Tanks for acids, alkalis, and cyanide wastewaters will each be stored in separate (three) containment areas (areas 1-3). Two

other separate storage areas (4 and 5) will contain the tanks for the alkaline and cyanide, special metal bearing wastes and another for the acid special metal bearing wastewaters. Each containment area will have concrete floor and will be surrounded by a berm which will provide a minimum capacity equal to 110% of the tank volume contained therein. Each containment area will also be equipped with a drainage pit to collect spilled or leaked materials. This containment system will provide containment for a volume in excess of the volume of the tanks contained within. The drainage pit will be equipped with a level indicator which will indicate when the drainage pit contains liquid. The liquid in the drainage pit will be analyzed, and then pumped to an appropriate storage tank.

(Each drainage pit will be equipped with a pump with a capacity of approximately 44 GPM.)

Portable pumps are on standby.

Each (receiving) storage tank (will be) is equipped with a liquid level indicator to signal when the tank is full and prevent overfilling.

(Each tank will also be equipped with a pump to pump materials from the receiving tank to the appropriate storage tanks after the waste

analysis procedures have been completed. The pumps will have a design capacity of approximately 88 GPM.)

8.32.2 STORAGE TANKS

The total capacity of the waste storage tanks will be (123,024) 219,112 gallons. There will be (28) 52 tanks, (ten) eighteen with a capacity of (6600) 6684 gallons and (18) 34 with capacity of (3168) 3200 gallons (see the floor plan for tank locations). Each of the (five) seven containment areas will be surrounded by a berm. These berms will provide sufficient containment volume to contain 110% of the volume of all the tanks within the containment area. More specific information on containment volume is provided in Table 8.1. The concrete floor of each containment area will be sloped to a drainage pit. The drainage pit will be equipped with liquid level indicators. If liquid accumulates in the drainage pit, it will be handled as described in Section 8.37.

There are (five) seven containment areas and drainage pits to contain the material from the storage tanks as follows:

Table 8.1 Containment Area Volumes for Storage Tanks

Area	Tanks	Contents	Approximate Tank Volume (gals)	Approximate Containment Volume (gals)
1	(S-1 thru S-2) B/CN 1-6	(CN waste water) CN/Alkaline Waste	(13,200) 39,600	(14,520) 52,000
2	(S-3 thru S-6) B 7-12	Alkaline waste water	(26,400) 39,600	(29,040) 52,000
3	(S-7 thru S-10) A 13-16	Acid waste water	26,400	(29,040) 36,000
4	(S-11) B/CN 17	Delivery spillage	2,952	(34,900)
4	(S-12 thru S-13) B/CN 18-23	(CN special metal bearing wastes) Primarily CN waste	(5,904) 15,840	(34,900) 31,500 B/CN 17-29
4	(S-14 thru S-15) B/CN 23-29	(Alkaline special metal bearing wastes) Primarily Alk. waste	(5,904) 19,008	(34,900)
5	(S-16 thru S-28) A 30-50	(Acid special metal bearing wastes) Acid waste	(41,184) 60,192	(45,300)
5	A 38	Spillage	3,168	58,000 A 30-50 & 38
6	CS 10	Acid Waste/Reagent	6,684	10,332
7	CS 11	Alkaline Waste/Reagent	6,684	9,116

8.32.3 TREATMENT TANKS

(The entire room containing the treatment Tanks T-1 through T-4 and the final purification plant will be bermed to contain any spill in this area (see Site Plan C (floor plan)). This berm will provide a containment volume of

approximately 21780 gallon which is greater than volume of the tanks in the area.)

The entire area containing the treatment tanks T-1 thru T-9 and the effluent tanks E-1 thru E-8 (Detox, Dewatering, Mefax) has a containment of approximately 130,000 gallons, which is greater than the volume of the tanks in the area. An 8 inch curb separates the detox room from the dewatering room and will contain greater than 110% of any reactor (7,000 gallons). Detox has over 11,000 gallons of containment capacity.

8.33 CONTAINMENT AREA ACCUMULATION

Liquids which accumulate in any of the proposed secondary containment areas will be handled as follows:

- a) If the exact source of the leaked or spilled material can readily be determined, the material will be identified accordingly. It will be transferred to an appropriate tank or container as applicable.
- b) If the source or identity of the spill cannot be determined, a sample will be collected and analyzed to see if it exhibits any of the four characteristics of a hazardous waste (ignitability, corrosivity, reactivity or EP toxicity), or to see if it contains any of the hazardous

constituents (40 CFR 261 Appendix VII) of any listed wastes stored in the particular containment area.

In either case (a) or (b) above, any accumulated liquid in secondary containment areas will be removed as soon as possible to preclude any possibility of overflow.

8.40 PRECAUTIONS RELATING TO FLAMMABLE WASTES

Only waste waters and sludges (as defined by EPA 40 CFR 260.10) are to be received at ETICAM's facility. These waste streams are non flammable and non combustible. Therefore, special precautions for flammable wastes are not needed. However, as a precaution, "no smoking signs" are to be posted about all unloading areas and throughout the plant.

8.41 PRECAUTIONS RELATING TO REACTIVE (CYANIDE) WASTE

The only reactive wastes at ETICAM are sulfide and cyanide bearing wastes which could generate toxic gases, (if cyanide were present at sufficient levels in the waste and) if exposed to appropriate pH conditions. Storage tanks containing these materials (typically plating baths) are maintained in totally separate storage areas at ETICAM, completely separate from other types of incompatible (acid) wastes, so that

there is no possibility of mixing during storage. The only areas where cyanides will be stored are Storage Areas 1 and 4 as shown on the Floor Plan (Site Plan C). Area 1 cyanide storage tanks are segregated from all other waste types by it's containment wall (berm). Area 4 includes both alkaline and cyanide special metal bearing wastes which are compatible and which are segregated from other waste types (acids). Therefore, the CN storage tanks are segregated from incompatible wastestreams (the acid wastewaters).

The problem of acid and cyanide incomparability is clearly discussed by Hartinger in Waste Water Handling, published by Carl Hanser Munich W. Germany 1976 (see chapter three).

The potential consequence of mixing a strong acid with a sulfide or cyanide would be the generation of H_2S or HCN gas as discussed in ETICAM's air discharge permit (see Appendix I).

In order to guard against this potential, acid or acid bearing material will never be stored within the cyanide storage areas. Further, all tanks and storage areas are vented through a scrubber system to insure against emissions to the environment.

In order to insure that reactive wastes are stored and treated in such a way so that reactive wastes are protected from any material or conditions that may cause the waste to react, the following precautions have been taken:

- (1.) Special discharge fittings are used to insure that wastes are discharged to the proper tanks.
- (2.) 1. All tanks, pipe lines and reactors are dedicated to insure that there is no co-mingling of products beyond the point of discharge.
- (3.) 2. All reactive wastes are stored in their own berms.
- (4.) 3. Storage and treatment methods have or will be reviewed by Nevada professional engineers to insure that they comply with National Fire Protection Association buffer zone requirements for tanks.
- (5.) 4. A separate unloading area has been designated for sulfide or cyanide wastes. This area is bermed and drained separately from the remainder of the unloading area to prevent possible interaction of sulfide or cyanides and acids due to spills. This area will also be used for the quarantining of any unreconciled sulfide or cyanide waste loads.

(6.) 5. All cyanide designated areas are alarmed with cyanide detectors which monitor cyanide levels and trigger an alarm at (20%) 50% of the OSHA limit (TLV of 10 ppm), or as specified in the facility air permit which may change from time to time.

8.50 EQUIPMENT FAILURE

8.51 POWER FAILURE

Since ETICAM is a storage and treatment facility only, the effects of equipment failure and/or power outages are minimal. However, the following equipment will be installed to mitigate the effects of power outages. In the event of a brief power interruption, security is not affected. A back-up system is in effect and will maintain the motion detectors and perimeter alarms and cyanide and hydrogen sulfide detectors in operation for a period of approximately four (4) hours.

A 150 kilowatt stand-by engine generator set (will be installed) is present which will provide power to the main control panel (alarms, level sensors, control systems, cyanide detectors, etc), the emergency lighting system, the air pollution scrubbers, and the air compressor (to power air-driven diaphragm pumps). The engine generator set will be diesel powered with at least 24 hours

of diesel supply, and will be automatically brought on-line with an automatic transfer switch in the event of power failure.

8.60 DESCRIPTION OF TANKS

8.61 GENERAL

Tanks used at ETICAM to store and/or process the hazardous waste streams are indicated on Site Plan C (floor plan) and on the Process Flow Diagram (Flow Chart - Exhibit A). The types (construction), usage, capacities, dimensions and wall thickness of the tanks are provided in Table 8.2. Compatibility of tank construction material with that of the stored material is also discussed in this section. The type and construction of tank foundations and supports are discussed in Section 8.63. Tank feed systems, safety cutoffs, bypass systems, and pressure controls are shown on the Process Flow Diagram (Section 14.00).

All tanks are vented through the scrubber system and are therefore maintained at atmospheric pressure at all times. See Drawings in Section 14.00. This system maintains a maximum pressure of 15 MBAR. Based on the DVS manufacturing specifications, tanks cannot collapse or rupture at these pressures.

All tanks at ETICAM will be subject to the routine inspection described in Section 5.00. Any problems noted during such inspections will be corrected prior to reuse of any defective tanks or associated equipment.

8.62 DESIGN STANDARDS/WASTE COMPATIBILITY

The design and construction of the tanks used to store and/or treat hazardous waste at ETICAM are appropriate for the material handled. The wastewater storage and treatment tanks will be manufactured in accordance with international standards for construction of tanks. Said specifications are included in Appendix H. The tanks are being constructed in Germany by Gutling, a well known tank manufacturer.

All storage and receiving tanks for cyanide, alkaline and spillage waste waters are constructed from polypropylene. One acid storage tank is to be constructed from (PVC-HSV) PVC-FRP. All other acid storage tanks are polypropylene. Construction materials, wall thicknesses and other information about the tanks is provided in Tables 8.2.

Polypropylene is widely used in electroplating rinse tanks because it has proved to be resistant

to the chemicals used. Storage and receiving tanks will only be used to hold materials at room temperature. Most of the waste waters accepted at ETICAM will consist of dilute solutions.

Polypropylene tanks are widely used for the types of chemicals and concentrations which will be accepted at ETICAM. Table 8.3 contains chemical resistance data derived from a table provided by the manufacturer. The manufacturer's complete table is provided in Appendix H. This information indicates that the storage and receiving tanks will be resistant to the wastewaters typically accepted at ETICAM.

The estimated corrosion or oxidation rates of these tanks is 0. Therefore, no wall thinning will occur during normal use.

Based on these facts, ETICAM requests an exemption from ultrasonic testing.

TABLE 8.2

See October, 1989 Revision
Page 8 - 21Wastewater Treatment and Storage
Tank Specifications

<u>Tank² No.</u>	<u>Description of use</u>	<u>Type (construction)</u>	<u>Capacity cu. meters gallons</u>	<u>Approximately Dimensions (lgth. x width x hgt. or dia. x hgt.) in m and feet</u>	<u>Wall Thickness (MM)</u>
S-1 thru S-2	collecting basin cyanide	polypropylene cylindrical vertical	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom
S-3 thru S-6	collecting basin alkali	polypropylene cylindrical vertical	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom
S-7 ³ thru S-8	collecting basin acid	polypropylene cylindrical vertical	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom
S-9 thru S-10	collecting basin acid	polyvinyl chloride cylindrical vertical	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom
S-11 thru S-12	collecting basin spe- cial waste water cyanide	polypropylene cylindrical vertical	12.2 3223.2	1.8 x 4.8 5.9 x 15.7	16 side 15 bottom
S-13 thru S-14	collecting basin spe- cial waste water	polypropylene cylindrical vertical	12.2 3223.2	1.8 x 4.8 5.9 x 15.7	16 side 15 bottom
S-15 thru S-28	collecting basin spe- cial waste water acid	polypropylene cylindrical vertical	12.2 3223.2	1.8 x 4.8 5.9 x 15.7	16 side 15 bottom
S-29A thru S-29B	collecting basin clear	polypropylene cylindrical	12.2 3223.2	1.8 x 4.8 5.9 x 15.7	16 side 15 bottom
S-30 thru S-31	collecting basin treated water	polypropylene cylindrical	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom

TABLE 8.2 (continued)

<u>Tank No.</u>	<u>Description of use</u>	<u>Type (construction)</u>	<u>Capacity M (gallons)</u>	<u>Approximately Dimensions (lgth. x width) x hgt. or dia. x hgt.) in m and feet</u>	<u>Wall Thickness (MM)</u>
T-1 thru T-3	treatment basin	PVC steel armouring PVC lining	27.6 7291.9	6.1x2.4x2.0 20.0x7.9x6.6	7 side 7 bottom 5 steel
T-4	neutralization basin	PVC steel armouring PVC lining	10.8 2853.4	2.8x2.1x2.0 9.2x6.9x6.6	7 side 7 bottom 5 steel
C-1 thru C-2	sludge tank	polypropylene cylindrical vertical	27.1 7159.8	2.4 x 6 7.9 x 19.7	24 side 20 bottom

Note: Specifications for the virgin chemical storage and feed tanks, the electrolytic system tanks, facility pumps, and wastewater effluent polishing equipment is provided in Appendix G.

1 - Source: ETICAM

2 - Location shown on Floor Plan (Site Plan C).

3 - Two tanks are to be constructed of PVC-HSV and are to be used to hold some of the concentrated acids.

TANK LEGEND

CURRENT DESIGNATION	NEW DESIGNATION	PURPOSE	VOLUME (gal)
S-11	B/CN 17	COLLECTING BASIN -	3223
S-12	B/CN 18	SPECIAL WASTE WATER	3223
S-13	B/CN 22	CYANIDE	3223
S-14	B/CN 24		3223
S-15	B/CN 23		3223
S-16	A-30	COLLECTING BASIN -	3223
S-17	A-29	SPECIAL WASTE WATER	3223
S-18	A-32	ACID	3223
S-19	A-31		3223
S-20	A-34		3223
S-21	A-33		3223
S-22	A-36		3223
S-23	A-35		3223
S-24	A-38		3223
S-25	A-39		3223
S-26	A-40		3223
S-27	A-42		3223
S-28	A-41		3223
S-1	B/CN 1	COLLECTING BASIN -	6684
S-2	B/CN 2	CYANIDE	6684
S-3	B-7	COLLECTING BASIN -	6684
S-4	B-8	ALKALI	6684
S-5	B-9		6684
S-6	B-10		6684
S-7	A-13	COLLECTING BASIN -	6684
S-8	A-14	ACID	6684
S-9	A-15		6684
S-10	A-16		6684

CS-7	CS-7	VIRGIN CHEMICALS	VARIES
CS-8	CS-8		VARIES
CS-9	CS-9		VARIES
CS-5.2	CS-5.2		VARIES
CS-5.1	CS-5.1		VARIES
CS-6	CS-6		VARIES
C-1		SLUDGE TANK	7159
C-2		SLUDGE TANK	7159
T-4.1		NEUTRALIZATION BASIN	2853
T-4		NEUTRALIZATION BASIN	2853
T-1		TREATMENT BASIN	7291
T-2		TREATMENT BASIN	7291
T-3		TREATMENT BASIN	7291
S-28.2	E-2	COLLECTING BASIN -	3223
S-29.1	E-1	CLEAR	3223
S-31	E-3	COLLECTING BASIN -	6684
S-32	E-4	TREATED WATER	6684
S-30	E-5		6684
S-33	E-6		6684
S-34	E-7		6684
S-35	E-8		6684

TABLE 8.2
Wastewater Treatment and Storage
Tank Specifications

Tank No.	Description of use	Type (construction)	Capacity cu. meters gallons	Approximate Dimensions (lgth. x width x hgt. or dia. x hgt.) in m and feet	Wall Thickness (MM) or U. S. Equilevant (IN)
B\CN-1 thru B\CN-6	collecting basin cyanide	polyethylene polypropylene cylindrical vertical	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom
B-7 thru B-12	collecting basin alkali	polyethylene polypropylene cylindrical vertical	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom
A-13 thru A-14	collecting basin acid	polyethylene polypropylene cylindrical vertical	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom
A-15 thru A-16	collecting basin acid	polyvinyl chloride cylindrical vertical fiberglass	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom
B\CN-17 thru B\CN-28	collecting basin special waste water cyanide	polyethylene polypropylene cylindrical vertical	12.2 3223.2	1.8 x 4.8 5.9 x 15.7	16 side 15 bottom
A-29 thru A-50	collecting basin special waste water acid	polyethylene polypropylene cylindrical vertical polyvinyl chloride fiberglass	12.2 3223.2	1.8 x 4.8 5.9 x 15.7	16 side 15 bottom
E-1 thru E-2	collecting basin clear	polyethylene polypropylene cylindrical vertical	12.2 3223.2	1.8 x 4.8 5.9 x 15.7	16 side 15 bottom
E-3 thru E-8	collecting basin treated water	polyethylene polypropylene cylindrical vertical	25.3 6684.3	2.4 x 5.6 7.9 x 18.4	24 side 20 bottom
T-1 thru T-3	treatment basin	PVC steel armoring PVC lining	27.6 7291.9	6.1 x 2.4 x 2.0 20.0 x 7.9 x 6.6	7 side 7 bottom 5 steel

TABLE 8.2
(Continued)

Rank No.	Description of use	Type (construction)	Capacity cu. meters gallons	Approximate Dimensions (lgth. x width x hgt. or dia. x hgt.) in m and feet	Wall Thickness (MM) or U. S. Equivalent (IN)
T-4 -5 1-8	treatment basins	PVC steel armoring PVC lining polypropylene polyethylene fiberglass	3500.0	8' dia x 15'	7 side 7 bottom 5 steel
-1 -2	neutralizat- ion basins	polyethylene PVC steel armoring PVC lining polypropylene fiberglass	10.8 2853.4	2.8 x 2.1 x 2.0 9.2 x 6.9 x 6.6	7 side 7 side 5 steel
-6 -7	treatment basins	PVC steel armoring PVC lining fiberglass rubberlined steel polyethylene polypropylene	27.6 7291.9	6.1 x 2.4 x 2.0 20.0 x 7.9 x 6.6	7 side 7 bottom 5 steel
-1 thru -4	sludge tanks	polyethylene polypropylene cylindrical vertical	27.1 7159.8	2.4 x 6 7.9 x 19.7	24 side 20 bottom
1 thru 2	crystallizer	mild steel, s.s. fiberglass	800 gal (ea)	8' dia x 8'	.25 in.
	falling film & multi/stage- evaporator	s.s. titanium	500 gal (ea)		
1 thru 4	centrate tanks	mild steel	250 gal	4 x 4 x 2 1/2	3/16 in.
1	dump tank	polypropylene	1000 gal	7' dia x 4'	7 mm side 7 mm bottom
2 thru 4	dump tanks	polypropylene polyethylene fiberglass steel	500 gal	4' dia x 5'	7 mm side 7 mm bottom

TABLE 8.2

(Continued)

NOTE: Specifications for the virgin chemical storage and feed tanks, the electrolytic system tanks, facility pumps, and wastewater effluent polishing equipment is provided in Appendix G.

- 1 - Source: ETICAM
- 2 - Location shown on Floor Plan (Site Plan C).
- 3 - Four tanks are to be constructed of PVC-FRP and are to be used to hold some of the concentrated acids.

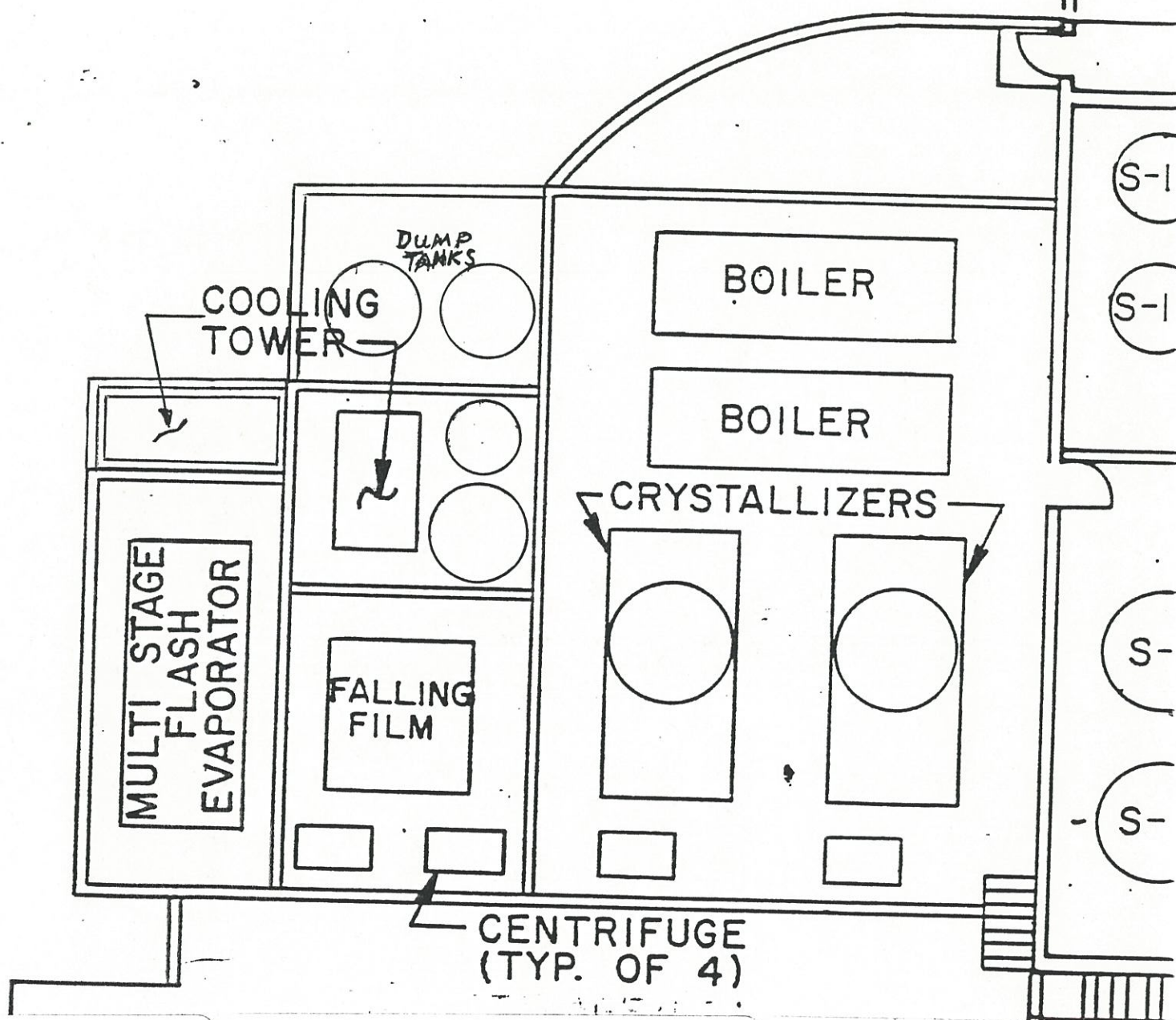


Table 8.3

CHEMICAL RESISTANCE DATA from Foema, Dr. Gotzelmann KG:
 Chemi Kalienbeständigkeit der Polyolefine HDPE and PP

Chemical Description	Temperature ° (C)	LINER RESISTANCE*	
		PVC	PP
Hydrochloric Acid HCL	60	+	+
Chromium Trioxide Cr ₂ O ₃	100	-	0
50% water	40	+	+
50% water	60	0	0
Chromium Trioxide/Sulfuric Acid/Water Cr ₂ O ₃ + H ₂ SO ₄ + H ₂ O			
50%/15%/35%	40	+	-
50%/15%/35%	60	0	-
Potassium Cyanide, KCN			
10%	40	+	+
10%	60	0	+
Acetic Acid CH ₃ - COOH			
25%	40	+	+
25%	60	+	+
25% - 60%	60	+	+
80%	40	0	+
80%	100	-	-
85%	80	-	0
85%	100	-	-
95%	40	0	0
Sodium Chloride, NaCl	60	0	+
Sulfuric Acid/Nitric Acid/Water			
48%/49%/3%	20	0	-
48%/49%/3%	40	0	-
50%/50%/0	20	0	-
50/50/0	40	-	-
10/20/70	50	+	0
10/87/3	20	0	-
50/31/19	30	+	-

Table 8.3

CHEMICAL RESISTANCE DATA from Foema, Dr. Gotzelmann KG:
 Chemi Kalienbestandigkeit der Polyolefine HDPE and PP

(Continued)

Chemical Description	Temperature	LINER RESISTANCE*	
	$\frac{g}{(C)}$	PVC	PP
Sodium Hydroxide, NaOH			
40%	40	+	+
40%	60	0	+
50/60%	60	+	+
50%	100	-	+
Nitric Acid, HNO ₃			
30%	50	+	+
30/50%	50	+	-
40%	70	-	-
40%	90	-	-
48%	80	-	-
70%	20	+	-
70%	60	0	-
98%	20	-	-
98%	60	-	-
Hydrochloric Acid, HCl			
30%	40	+	+
30%	60	0	+
30% (ueber)	20	+	+
30%	60	0	0
30%	80	-	-
Sulfuric Acid H ₂ SO ₄			
40%	20	+	+
40%	40	+	+
70%	20	+	+
70%	60	0	0
80 - 90%	40	+	0
96%	20	0	0
96%	60	-	-

* Liner Resistance Rating (To indicated material at indicated temperature):

- = unsatisfactory 0 = satisfactory + = good

Lab technicians who carry out the waste analysis procedures outlined in Section 3.00 will determine which tanks to store waste in. These personnel will be familiar with manufacturer's specifications for tank/material compatibility. If they encounter a concentrated corrosive material in the course of the waste analysis procedures they will determine whether the material should be stored in the polypropylene tanks at that concentration. They may specify that the material be diluted before being stored, if necessary. For concentrated acid solutions, lab personnel will determine whether better resistance to the material will be found in the PVC-(HSU)FRP tank or the polypropylene tank, and store the material accordingly. Waste analysis procedures are detailed in Section 3.00.

Treatment tanks used at ETICAM (will be) are constructed of polypropylene, fiberglass or welded steel plates lined with rubber or PVC. The PVC will protect the steel from corrosive material treated in the tanks.

All wastewater treatment and storage tanks will be tested periodically by ultrasonic testing in order to detect wall thinning due to corrosion.

If wall thinning is found in any tank, the history of the tank will be reviewed in an attempt to determine the cause. If wall thinning is significant, the tank will be removed from service.

8.63 TANK FOUNDATIONS AND SUPPORTS

The design of tank supports, bracing, and foundations are reviewed in this section. The information is intended to demonstrate that the proposed supports, bracing, and foundations will adequately and safely support the waste storage and treatment tanks at ETICAM.

A typical storage/treatment tank support and foundation system are shown on the attached drawing. This system will be designed to resist seismic forces in accordance with the Uniform Building Code, 1982 Edition. Fernley lies in Seismic Zone 3, a region with a high probability for a seismic event. The support system will prevent tank overturning and will resist sliding of the tank by transference of lateral forces to the foundation. All design and construction will be performed in accordance with applicable codes and ordinances.